EUROPE 1992 AND ITS EFFECTS ON U.S. SCIENCE, TECHNOLOGY AND COMPETITIVENESS

HEARINGS

BEFORE THE

COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY U.S. HOUSE OF REPRESENTATIVES

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EUROPE 1992 AND ITS EFFECTS ON U.S. SCIENCE, TECHNOLOGY AND COMPETITIVENESS

TUESDAY, MAY 16, 1989

House of Representatives,
Committee on Science, Space, and Technology,
Washington, D.C.

The committee met, pursuant to call, at 9:40 a.m., in Room 2318, Rayburn House Office Building, Hon. Robert A. Roe, [chairman of the committee] presiding.

The **Chairman**. Good morning, ladies and gentlemen.

The hearing will begin on Europe 1992 and its effects on the United States science, technology and competitiveness.

Our first group of witnesses, Mr. Ralph Johnson, Deputy Assistant Secretary of Trade and Development, Bureau of Economic and Business Affairs; Mr. William H. Dameron, Deputy Director of Office of Regional and Political and Economic Affairs, Bureau of European and Canadian Affairs; Ambassador Peter Jon DeVos, Deputy Assistant Secretary for Science and Technology Affairs.

So why don't we have those witnesses come forward if we may and we will get started.

Let me say at the opening that today our committee begins two days of hearings on a subject that is critical to the nation's future. We will examine the massive and profound changes arising from the integration of the European market, known for short as "Europe 1992". We are deeply concerned about the effects of Europe 1992 on American industry, American business and commerce, and ultimately American standards of living.

This important subject arises from the fact that, at the end of the year 1992, the countries of Europe will implement an ambitious plan to drop most of the trade barriers between the 12 nations that are members of the European Community. It is a plan that will produce an economic revolution in Europe and it is a move that will revolutionalize America's economic relations with the countries of Europe.

All the longer-term implications of Europe 1992 for America's economic survival are not crystal clear at this time. What is clear is that we in this country are facing an unparalleled challenge to our science and technology, to our capacity for technological innovation and to our ability to compete in the world marketplace.

This hearing is part of a more extensive series of hearings which the committee is conducting on the broad basic theme of creating the new wealth that we must have to sustain the future viability of this country. We are acutely aware that the well-being of the

American people, our standard of living, and our security in the world is strongly dependent on a series of interrelated factors: open and equal access to all world markets, innovative technological leadership, and frontier advantages in fundamental science.

To put the spotlight on the many facets of this question, we have earlier held hearings on "Technology transfer to Allied Nations" and on "Research and Development Funding in the 1990s." Later this month, we will continue this series with hearings on "Science and Mathematics Education in the United States."

It is our expectation that through these several hearings, we will be able to put together the threads that will make up a much stronger and much more effective fundamental policy for American economic survival in the decade leading up to the year 2000 and beyond.

To help us explore today's topics, we are delighted to have a series of distinguished witnesses from government, industry and academic world and we want to welcome all of our witnesses to this hearing.

The Chair now defers to the distinguished gentleman from New York, Mr. Boehlert.

Mr. BOEHLERT. Mr. Chairman, in the spirit of bipartisanship, let the record show that I agree with everything you said in your opening statement and I do wish to commend you for having this hearing now, on Europe 1992, in 1989, rather than following the rule that has so often prevailed in other committees, you have a hearing on Europe 1992 in 1995. So you are ahead of the game, as you usually are, Mr. Chairman. It is a pleasure to be here and I am particularly impressed with the distinguished witnesses we have assembled.

The CHAIRMAN. I thank the gentleman from New York.

The Chair recognizes the distinguished gentleman from California, Mr. Brown, for any opening statement he may wish to make.

Mr. BROWN. Thank you, Mr. Chairman. I do not have a statement.

The CHAIRMAN. The gentleman from Missouri, Mr. Volkmer.

Mr. VOLKMER. No opening statement.

The CHAIRMAN. The Chair would ask unanimous consent at this point to put the statement of Mr. Walker in the record. If no objection, so ordered.

[The prepared statement of Mr. Walker follows:]

OPENING STATEMENT

HON. ROBERT S. WALKER (R-PA)

HEARING ON EUROPE 1992

MAY 16, 1989

MR. CHAIRMAN:

IN 1985, THE NATIONS IN THE EUROPEAN COMMUNITY BEGAN A PROCESS INTENDED TO HARMONIZE AND FACILITATE THE FLOW OF GOODS, MONEY AND PEOPLE BETWEEN THE NATIONS. THIS 1992 PLAN -- NAMED AFTER THE SCHEDULED TARGET YEAR FOR ITS COMPLETION -- COVERS 279 DIRECTIVES ATTEMPTING TO REMOVE EXISTING PHYSICAL, TECHNICAL, AND FISCAL BARRIERS OF TRADE AMONG ITS TWELVE NATIONS.

NONE OF THE 279 (TWO HUNDRED AND SEVENTY NINE) EC DIRECTIVES DIRECTLY ADDRESS THE

SUBJECT OF INTERNATIONAL SCIENCE; YET AS COOPERATIVE RESEARCH IN BASIC SCIENCE AND CONSORTIA IN COMMERCIAL TECHNOLOGY INCREASE IN NUMBER, AND QUESTIONS ARISE OVER WHO CAN PARTICIPATE IN THESE ARRANGEMENTS AND WHO CAN'T, IT IS LIKELY THAT EUROPEAN-AMERICAN FLOWS OF SCIENCE AND TRANSFER OF TECHNOLOGY WILL COME UNDER NEW SCRUTINY.

MANY U.S. BUSINESS LEADERS ARE BECOMING CONCERNED THAT EUROPEAN ORGANIZATIONS SETTING STANDARDS WILL NOT ALLOW AMERICAN INPUT INTO THE STANDARDIZATION PROCESS, AS OTHER INTERNATIONAL ORGANIZATIONS HAVE ALLOWED IN THE PAST. WHILE U.S. COMPANIES MAY ADJUST TO THESE NEW STANDARDS -- AT SOME COST -- IT ALSO MAY; ULTIMATELY AFFECT THE ABILITY OF U.S. COMPANIES TO SELL NEW PRODUCTS IN A SINGLE EUROPEAN MARKET.

EUROPE 1992 CAN PROVIDE GREAT OPPORTUNITIES FOR U.S. SCIENTIFIC RESEARCHERS TO EXCHANGE INFORMATION AND KNOWLEDGE WITH EC'S SCIENTIFIC COMMUNITY, AND FOR AMERICAN BUSINESSES TO GAIN ACCESS TO A SINGLE DEREGULATED MARKET -- IF BOTH THE U.S. GOVERNMENT AND INDUSTRIES APPROACH THIS PROCESS WITH INTELLIGENCE AND FORESIGHT. THE 1992 PLAN IS REALLY A PROCESS, ONE THAT IS OCCURRING IN 1989. A FULLER UNDERSTANDING OF THIS PROCESS WILL BE INTEGRAL FOR ADDRESSING THE EUROPEAN UNIFICATION PLAN IN A TIMELY AND COMPREHENSIVE MANNER.

I LOOK FORWARD TO THE TESTIMONY FROM OUR DISTINGUISHED WITNESSES.

The **Chairman**. The Chair also asks unanimous consent that U.S. Representative Jerry Costello's statement be placed in the record at this point and the Chair recognizes the—who is going to be leadoff here?

[The prepared statement of Mr. Costello follows:]

OPENING STATEMENT
BY U.S. REP. JERRY COSTELLO
COMMITTEE ON SCIENCE, SPACE AND TECHNOLOGY
MAY 16, 1989
"EUROPE 1992"

Mr. Chairman, many Americans in recent years have become more aware of the United States' trade position with Japan and the struggle we have faced in exporting goods to that country. In 1992 we will see a barrier-free "common market" in Europe, an integrated market of 320 million consumers. What will be the future for this new market for U.S. businesses? Will our trade position be stronger, or weaker, than our present position?

We must begin to consider what challenges lie ahead so that our trade policy becomes more active than reactive. We have seen in the 1980's our trade position become weaker and more dominated by overseas governments, while our base industries have deteriorated.

Europe '92 will mean stronger competition, and must have to begin now to consider how our economy will adapt to changes in the world economy. I want to thank Chairman Roe for his leadership in bringing these issues to the forefront, because more attention and scrutiny to this issue will result in real change in our trade policy.

Ambassador Peter de Vos was named Deputy Assistant Secretary of State for Science and Technology in April 1987. Previously, he had served as the U.S. Ambassador to Mozambique (1983-87), and Ambassador concurrently to the Republic of Guinea-Bissau and the Republic of Cape Verde (1980-83). He was stationed at various other posts abroad, including Brazil, Italy and Greece. He is the only American diplomat to have served in all of the Lusophone countries of Africa. In addition, Ambassador de Vos was the Brazil desk officer (1964-66), Special Assistant to the Assistant Secretary for American Republics Affairs (1973-75), and Deputy Director, Southern African Affairs (1979-80).

Ambassador de Vos was born in San Diego, California, in 1938. He was graduated from Princeton University in 1960 and received a Masters degree from Johns Hopkins University School of Advanced International Studies in 1962. In 1978, he attended the National Defense College. He is fluent in Spanish, Portuguese, Greek and Italian.

#0546U

The CHAIRMAN. Ambassador deVos.

STATEMENT OF AMBASSADOR PETER JON DEVOS, DEPUTY ASSISTANT SECRETARY FOR SCIENCE AND TECHNOLOGY AFFAIRS, BUREAU OF OCEANS AND INTERNATIONAL ENVIRONMENTAL AND SCIENTIFIC AFFAIRS; ACCOMPANIED BY RALPH JOHNSON, DEPUTY ASSISTANT SECRETARY FOR TRADE AND DEVELOPMENT, BUREAU OF ECONOMIC AND BUSINESS AFFAIRS; AND WILLIAM H. DAMERON, DEPUTY DIRECTOR, OFFICE OF REGIONAL POLITICAL AND ECONOMIC AFFAIRS, BUREAU OF EUROPEAN AND CANADIAN AFFAIRS, DEPARTMENT OF STATE, WASHINGTON, D.C.

Mr. DEVOS. Thank you very much, Mr. Chairman. I am Peter Jon DeVos, the Deputy Assistant Secretary of State for Oceans, Environment and Science.

With me today are Mr. Ralph Johnson, Deputy Assistant Secretary for Trade in the Economic and Business Bureau; and Mr. William Dameron, Deputy Director of the Office of Regional Economic Affairs, in the Bureau of European and Canadian Affairs.

With your permission, Mr. Chairman, I would like to enter my written remarks for the record and then make some oral comments.

The CHAIRMAN. With no objection, so ordered. The gentleman is recognized.

Mr. DEVOS. Thank you, Mr. Chairman.

Support for the European Community has been a cornerstone of U.S. foreign policy in the post-World War II era. U.S. policymakers at all levels have been convinced that European integration will strengthen Western Europe and the Atlantic community, a conviction aided by the fact that 11 of the 12 member states of the European Community are also—belong to the 16-nation NATO Alliance.

Looked at today, we believe on balance, that the single-market program for 1992 will lead to a more dynamic and deregulated market. At the same time, the U.S. must ensure that EC policies do not harm or discriminate against U.S. basic interests.

It is very important to understand that the 1992 program and its related directives are essentially economic and trade measures. These directives have very little to say specifically about science and technology in relation to 1992. Nevertheless, as 1992 comes to realization, there may well be challenges to U.S. science and technology interests, the most significant of which is likely to concern competitiveness.

Other potential challenges could include shifts in European R&D priorities, as well as problems related to access to the results of European research. I will address these three areas in turn; then I would like to say a few words on how our S&T interests might stand to gain.

The competitive implications have to do with the increasing trend towards pan-European cooperation in high technology throughout the 1980s, and above all, in commercially competitive areas such as information technology.

Commercial competition is the major driving force in the European Community's own R&D program, as well as in the several other cooperative mechanisms like Eureka. It reflects a deeply felt concern that European industries are lagging behind others, such as the United States and Japan.

Today, the European Community's own R&D program, commonly known as the Framework Program, is highly oriented to meeting industrial needs in areas such as information technology, telecommunications and manufacturing. The largest EC program by far is Esprit, which was initiated in 1984. Esprit currently has a multiyear budget of about $1.92 billion and is focused on enhancing information technology.

The Eureka program is formally independent from the European Community's R&D program, but it is closely linked to it. Since 1985, 213 cooperative projects have been announced in the fields of information technology, robotics and high-technology fields such as high-definition television projects.

The total Eureka portfolio involves an annual effort of about $1.2 billion. It is important, however, to keep these pan-European R&D figures in their true perspective.

The European Community's R&D effort, administered from Brussels, is currently on the order of about $1.2 billion per annum. This total is only about 2 percent of all government-funded R&D in the member states. Individual member state financing of the gross domestic expenditure in R&D in 1986 alone amounted to about $8 billion in the United Kingdom, $12.3 billion in France, and $12 billion for the Federal Republic of Germany.

There are other examples of pan-European cooperation in science and technology, such as CERN, for nuclear research, and the European Space Agency, for Space. When it comes to the development of technology in commercial areas, for the most, these efforts reflect a degree of central direction and industrial policy that are really different than that situation in the United States.

In the U.S., outside of areas such as defense and space, the government's role is mainly concentrated on basic research. But let me be frank, Mr. Chairman. It is difficult at this stage to say just how successful Europe's strategy in this area will be. These developments deserve to be watched closely.

With respect to possible shifts in the European R&D, the indications are far less clear. Historically, national efforts of the member states have counted for the overwhelming majority of all R&D. Such may well continue to be in the case of the foreseeable future.

Of greater relevance will be the long-term trends. The competitive pressures, when most internal barriers to trade are removed in the European market, are apt to be fierce. Some member states might decide to put more emphasis on research and technology development, which have a greater chance of commercial return.

Mr. Chairman, let me now address the topic of foreign access to research in Europe. Presently, U.S. multinational companies having subsidiaries established in Europe can and, in fact, do participate in the community's Framework Program. For example, more than a dozen American firms are involved to some degree in the Esprit program. Clearly, we would like them to have even greater access. On the other hand, the Europeans are concerned that they have less access to the U.S. R&D base, which they feel is becoming ever more restricted.

The question of access is an area where we need to maintain the dialogue with the community and its member states. There is a concern where the Department of State intends to remain in the forefront in consonance with the specific responsibilities that Congress has given to the Secretary of State.

As arrangements for the single market are completed, Mr. Chairman, there are potential opportunities for the United States. We must remember that the breadth of the tradition of scientific and technological cooperation between the U.S. and the member states of the European Community is profound, indeed.

For instance, if one effect of European economic integration is to increase the scientific and technological capability of the community, while providing the U.S. with access to a larger and more open European market, then our own science and technological interests can only benefit from such a development.

Finally, Mr. Chairman, I would also underscore that an impressive record of cooperation with Europe in various high-technology fields already exists. The most recent illustration is Europe's commitment to cooperate with NASA in Space Station Freedom, the largest civil international S&T undertaking ever.

There, our European friends and allies will contribute, in addition to their considerable know-how, about $3 billion in funding. The 1992 agenda, as we know it now, should not have any negative repercussions on these well-established relationships. In fact, a stronger, more united Europe in the high-technology fields, may well shoulder an increasing share of the research needed to solve global problems and to enlarge the range of opportunities for cooperation among us.

Thank you, Mr. Chairman. I have concluded my summary remarks and, together with my colleagues, are prepared to respond to the committee's questions.

[The prepared statement of Mr. deVos follows:]

Statement by Peter Jon de Vos
Deputy Assistant Secretary for
Science and Technology Affairs
Department of State

House Committee on Science, Space and Technology
U.S. Congress
May 16, 1989

Thank you, Mr. Chairman. It is a pleasure for me to be able to provide you and other members of the Committee with the Department of State's views about the relationship of 1992 in Europe to our own science and technology interests. It is a very important, as well as timely, subject and where, I am frank to admit, there is a need for deepening the analysis in our own country. I would like to begin with some brief comments about European economic integration in general.

The European Community (EC) has moved continually toward greater economic integration since its origins in the 1950s, and support for the Community's development has been a cornerstone of U.S. foreign policy in the post - World War II era. We are convinced that European integration will strengthen Western Europe and the Atlantic Community, aided by the fact that eleven of the twelve member states are also fellow members of the sixteen member NATO alliance.

The basis for the single market program is contained in a 1985 White Paper by the European Commission, the Community's executive and administrative body, which identified 300 directives (since reduced to 279) needed to remove physical, technical, and fiscal barriers among member states. The program received an important boost in 1987 with the entry into force of the Single European Act, which provides for qualified majority, rather than unanimous, voting in the Council of Ministers to adopt most legislation. The Single European Act also set the 1992 deadline for the program. We believe on balance that the single market program will lead to a more dynamic and deregulated market, but the U.S. is also taking care that EC policies are not adopted which harm or discriminate against our interests.

It is very important to note that the 1992 program and its related directives are essentially economic measures, that is the removal of trade barriers that impede the functioning of the Common Market. They have very little to say directly about science and technology in relation to 1992. But the fact that science and technology, itself, is not prominent in the single market program does not mean that 1992 has no implications for U.S. science and technology interests. Our judgment is that there may well be challenges to U.S. science and technology interests that could take several forms, the most significant of which may concern competitiveness. Other challenges which could emerge, but which are more problematic, include shifts in European R and D priorities, and problems related to access to the results of European research. I will address these three areas in turn.

The competitive implications have less to do with specific provisions of the single market program or the Single European Act than to the increasing trend towards pan-European cooperation in high technology throughout the 1980s. Above all, this direction is true in commercially competitive areas, such as information technology. It is the major driving force in the Community's own R and D program, as well as in several other cooperative mechanisms, like EUREKA. It reflects a deeply felt concern that European industries are lagging behind their Japanese and American competitors. Indeed, it is probably the dominant trend in European science and technology, and one which may gain further momentum as arrangments are completed for the single market program.

Today the Community's own R and D program, the so-called Framework Program, is highly oriented to meeting industrial needs and promoting intra-European cooperation in accordance with the Community's mandate. The Community pursues these objectives by requiring matching funds from industry. It does so in areas such as information technology, telecommunications and manufacturing, and the most significant projects in these three fields are known by their French acronyms, ESPRIT (information technology), RACE (telecommunications), and BRITE (manufacturing technology). The largest program, by far, is now ESPRIT, which was initiated in 1984. Now, in its second phase, ESPRIT currently has a multi-year budget of 1.6 billion ECUs, about $1.92 billion.

It is important, however, to keep these figures in perspective. In 1986, governmnent R and D budgetary outlays in the twelve member states of the Community amounted to about 35.5 billion ECUs, equivalent to about $42 billion, of which about 27 billion was civil. By way of comparison, The Community's own R and D effort administered from Brussels is currently on the order of 1 billion ECU per annum (about $1.2 billion). This figure represents about two percent of all government-funded R and D in the member states and about three percent of all civilian R and D funded by the member states. Similarly, individual member state financing of the gross domestic expenditure on R and D (GERD) in 1986 alone amounted to about $8 billion for the United Kingdom, $12.3 billion for France, and $12 billion for the Federal Republic of Germany.

The seeds of EC science and technology cooperation can be found in Article 55 of the European Coal and Steel Community Treaty of 1951, which provided that the results of the research in this area should be made available to all concerned in the Community. In 1957, the Euratom Treaty gave the Community a role in nuclear research, with its own Joint Research Centre and also laid down rules for the dissemination and licensing of the research results. In addition, the Treaty of Rome charges the Commission with ensuring that Community policies are developed which foster European economic growth. This authority was made explicit in the 1987 Single European Act, which does mention science and technology briefly in Title VI. It establishes the basic aim of the Community's research and technology development as being "to strengthen the scientific and technological basis of European industry and to encourage it to become more competitive at the international level." Title VI also makes clear that the Community's role is one of "complementing" the activities carried out in member states. These provisions generally reflect what has been the Community's traditional function in this area.

One new development is a change in the way the Community's own R and D program is adopted. The Single Act now provides a two-stage approach: unanimous adoption of a multi-annual Framework Program which provides the basis for Council decisions on specific projects; and, decision by a qualified majority on the specific projects. This change seems to place the program on a more solid footing by reducing the scope for disagreement between member states on funding levels.

The EUREKA program is formally independent from the Community's R and D program, but is closely linked to it. EUREKA was initiated in 1985 by President Mitterrand. The current membership includes the twelve member states of the Community, the European Commission, and seven other European states. Since 1985, 213 cooperative projects have been announced in the fields of information technology, robotics, biotechnology, communications equipment and other high technology fields, such as the High Definition Television Project. According to published information, the total EUREKA portfolio has an estimated value of some 3.8 billion ECUs, equivalent to an annual effort of about 1 billion ECUs or $1.2 billion.

Despite EUREKA's formal independence from the European Community, the Commission has a major role inside EUREKA in coordinating projects. Both programs clearly have parallel objectives, as well as research operations. The kind of cross-border cooperation that is mandated in these programs apparently also has helped to galvanize Europe's high technology industries as 1992 approaches, with a rash of mergers and reorganizations.

Together, the various pan-European high technology programs also reflect a degree of central direction and industrial policy in European R and D that is really much different than the situation in the United States, where outside of areas such as defense and space the government's role in R and D is mainly concentrated on basic research. It is very difficult at this stage to say how successful Europe's strategy in this area will be. Or, whether the restructuring of European industry that has been prompted by 1992 will mean much tougher competition for our own companies. We think that these are developments, however, that deserve to be watched closely.

With respect to possible shifts in European R and D, the indications are far less clear. There has been speculation that European economic integration will also mean much greater central direction from Brussels in R and D. However, there is nothing specific in either the single market program or the Single European Act that addresses the displacement of national R and D efforts or shifts in funding priorities. Historically, as I have already noted, national efforts of the member states have accounted for the overwhelming majority of all R and D -- public and private -- carried out in Europe. We believe that will continue to be the case, although integration of other policies may spur more EC programs over time. Of greater relevance will be the longterm trends at the national level. The competitive pressures when most internal barriers to trade are removed in the European market are apt to be fierce. In such an environment, some member states might decide to put more emphasis on research and technology development that has a greater chance of providing commercial returns than on the traditional areas of basic science.

Concerning access to research in Europe, presently U.S. multinational companies having subsidiaries established in Europe can -- and do -- participate in the Community's Framework Program. For example, more than a dozen American firms are involved to some extent in the ESPRIT program. Clearly, we would like to have even better access to those programs, and we held talks with the European Commission along those lines last December. The Europeans are concerned that, on balance, they already are having less access to the U.S. R and D base, which they feel is becoming more restricted in recent years as defense outlays for R and D have grown and have been extended to programs like SEMATECH where foreign participation is excluded. This is an area where we need to keep up the dialogue with the Community and the Member States. It is one where the Department intends to remain engaged and in the forefront in consonance with the specific responsibilities the Congress has given to the Secretary of State.

On the other hand, Mr. Chairman, as arrangements for the single market in Europe are completed, the United States could also be presented with some new opportunities. We hope that the balance of new developments having an impact on science and technology in Europe will lie in increased opportunities for American firms and researchers, and serve to strengthen trans-Atlantic cooperation. The breadth of the tradition of scientific and technological cooperation between the U.S. and the member states of the Community is profound. Most such cooperation takes place informally between individuals and our respective private companies and cannot be measured with any degree of specificity. If one effect of European economic integration is to increase the scientific and technological capability of the Community while providing the U.S. with access to a larger and more open European market, then our own science and technology interests can only benefit.

There may also be some specific opportunities in the near term. For example, while the bulk of international agreements in science and technology involving Europe are executed bilaterally with the member states of the EC, we do have a number of specific arrangements with the European Community, itself. These fall mostly into traditional areas of research embodied in the Framework Program, such as nuclear and environmental, and do not provide us with many insights into the programs geared to European industry in the more competitive areas like telecommunications and information technology. It is interesting to note, however, that the Single European Act makes explicit provision for cooperation with third states in the Framework Program, and this is something that we are in the process of exploring further with the interested USG agencies and departments.

Finally, Mr. Chairman, I would also note that, as the Committee is certainly aware, an impressive record of cooperation with Europe in certain high technology fields already exists, perhaps the best-known being space research, where the European governments have taken a coordinated approach for many years through the European Space Agency. The most recent illustration of the level of cooperation we have in this field is Europe's commitment to cooperate with NASA in Space Station Freedom. There the effort of European friends and allies will amount to about $3 billion. The 1992 agenda should not have any negative repercussions on these well-established relationships. In fact, we believe that a stronger, more united Europe in the high technology fields can shoulder an increasing share of the research needed to solve global problems, and enlarge the range of opportunities for cooperation between us.

The CHAIRMAN. Thank you, Ambassador.

Are there questions? The gentleman from California, Mr. Brown.

Mr. BROWN. Mr. Ambassador, I note with interest the figures you give on the total European Community R&D, $42 billion, I think. But the interesting thing to me is the distribution which apparently is about $27 billion civilian and $15 billion military. That is almost the exact reverse of what the situation is in the United States, where about two-thirds of the government-funded R&D is military and one-third is civilian.

What—can you offer a comment as to what this effect would be on our competitiveness situation?

Mr. DEVOS. Mr. Chairman, I think that is a question of the history and the traditions in Europe, as opposed to in the United States, and as you quite correctly pointed out, in the United States, most of our military research and development is done in the public sector. That has not necessarily been the case in Europe.

I think that in terms of 1992, it is a little bit early to make a prediction that we will see a change in the emphasis and I do not at this point see great changes occurring as a consequence of 1992.

Mr. BROWN. You mean the relative proportion between civilian and military R&D is going to be about the same.

Mr. DEVOS. That is what I would foresee at this point, yes, sir.

Mr. BROWN. How about the—would you anticipate that there would be a continuing trend toward a greater integration, a total community-wide integration of both the civilian and the military R&D components?

Mr. DEVOS. Within—certainly within the NATO states, the NATO countries, I think that would be the case and that would probably be to our benefit to have that happen.

Mr. BROWN. Thank you very much.

The CHAIRMAN. The chair recognizes the distinguished gentleman from New York, Mr. Boehlert.

Mr. BOEHLERT. Mr. Ambassador, at our embassies in Europe and in the nations involved, are all of our science counselor positions filled?

Mr. DEVOS. That is correct, Mr. Congressman. We have—not all of our embassies in Europe have science counselors. Some of the—the principal ones do. Where we do not actually have science counselors, we have people in the economic sections who devote considerable attention to science work.

Mr. BOEHLERT. Are they scientists-diplomats or diplomats who happen to have a science portfolio?

Mr. DEVOS. I think both is the situation. Our science counselor, for instance, in Paris, is a nuclear physicist who has worked—he taught at Harvard and elsewhere. He joined the State Department, worked in the State Department and has been in Paris, I think, about three and a half years.

Mr. BOEHLERT. Is there a conscious effort within the Department of State to upgrade the position of science counselor? I mean, I am encouraged, as I hope you are, by the President's upgrading of the position of Science Advisor to the President and I think as we are approaching—well, we are right in the midst of this technological age, it is critically important that we recognize the key role these science counselors play.

Is there a conscious effort, one, to fill all the positions with people with a scientific background, and two, to upgrade those positions?

Mr. deVos. In terms of recruiting for the science counselors, we have a very active role, a very active program going on immediately. Last year, the president issued an executive order instructing the Secretary of State to actively recruit from amongst the science community and, in fact, we are doing that.

In addition to which, within the Foreign Service itself, we are looking to trying to identify and, in fact, identifying people that do have either a scientific background as such or scientific interest and trying to meld the two qualities of diplomat and scientist together.

In terms of upgrading the science positions, I am not quite sure what you have in mind, sir.

Mr. Boehlert. Well, to give them the recognition and due they are—they should be accorded and to listen to them once in a while. I sometimes wonder if we listen when people speak.

Mr. deVos. Let me assure you, the United States Government gives a lot of credence to the science counselors. In most cases—again, depending whether they are science counselors or science attaches, but in most cases, these gentlemen report individually or directly to the ambassador and, of course, within the Department of State, we do have a Bureau of Oceans, Environment and Science, and we coordinate very, very closely with the regional bureaus in reporting—on what the priorities—for the Department of State, for the United States Government are, as well as the priority reporting for the embassies themselves.

Mr. Boehlert. Two other related questions. One, are you having difficulty filling these positions? They are not very competitive in terms of what the government can offer the people that we are trying to entice to take these positions. Is the level of compensation a problem, as you are trying to reach out into the scientific community and convince these very capable people that now is the time to serve?

Mr. deVos. Compensation is always a problem, Mr. Congressman, and, in fact, the government does not compete well against the private sector. On the other hand, I would say that there is a certain allure to being a science attache in one of our missions.

I have been amazed; I have been in my job just over two years, and I have been amazed, especially in the past year, that we have made this effort to recruit, and be in contact with people inside and outside of the Department of State—at the number of people applying for these jobs. I can show you a stack of many, many feet high of applications and there is a great deal of interest.

So I would have to say that although compensation is a problem, it is not an overwhelming one and yes, we do have many candidates.

Mr. Boehlert. And secondly, do you have a network within the European Community of our science attaches? Do they meet and exchange ideas and notes and observations on a fairly regular basis?

Mr. deVos. It is surprising that, in fact, they do that quite a bit. In addition to their own initiatives that they take, we have an annual S&T conference for the science attaches here in the United States and from time to time, they have their own regional conferences. The last one, I believe, was about six months ago.

Mr. **Boehlert**. I know we found it very instructive when the chairman invited the science attaches to come meet with the committee and we had a very impressive array of talent before us and it was very helpful to us. We were listening. I hope somebody over in Foggy Bottom is listening.

The other question is, there is a tendency, I think, on the part of a great number of people, particularly in this town, to fear Europe 1992, rather than look forward to the opportunities. And I am particularly enamored with the thought that we can have more international scientific cooperation, particularly in the so-called big science, the very costly projects. SSC is a good example.

Do you see that opportunity there for Europe 1992 and U.S.-Europe cooperation on some of these big science projects so that we can not only share the burden of cost, but we can share the benefit?

Mr. **deVos**. Absolutely, Mr. Congressman, I would endorse what you have said. I think that the Space Station is probably leading the way in the sense of cooperation, not only with the Europeans, of course, but with the Canadians and with the Japanese, but yes, I would foresee that on the SSC. This is still in its preliminary stages, but we, the Department of Energy, of course, has sent them out in formal teams to have contacts, informal contacts with the Europeans and with others and I think that the expression has been positive. As I said, it is still in the initial stages, but I think that that is certainly the way for the future.

Mr. **Boehlert**. Okay, thank you.

Thank you, Mr. Chairman.

The **Chairman**. I thank the gentleman from New York.

The Chair recognizes the distinguished gentleman from Missouri, Mr. Volkmer.

Mr. **Volkmer**. Thank you, Mr. Chairman.

Mr. Ambassador, from your statement, it appears that you do not foresee the European Community as a community in the immediate near future changing their R&D policies from each individual country promoting their own to one policy, is that correct?

Mr. **deVos**. Essentially, that is correct, yes, sir.

Mr. **Volkmer**. However. we do see some combination, like in, as you pointed out in your statement, in Eureka and Esprit and others, where there is more applied technology, correct, or applied research?

Mr. **deVos**. That is correct.

Mr. **Volkmer**. Do you see that possibly after 1992, when they get all the bugs out of their operation as far as reducing tariff barriers and nontariff barriers and have more freedom of movement for business and individuals, et cetera, that they may develop such a policy?

Mr. **deVos**. Mr. Congressman, I am not in a position to foresee the future that clearly, quite frankly. I think that is always a possibility and it is something that we should be very alert to. But I would not want to make that prediction at this moment, sir.

Mr. **Volkmer**. Would it not be possible, in the areas, especially in basic research, where they could come up with something like the NSF?

Mr. **deVos**. I confess, I do not know the details. There is, in my understanding, a European Science Foundation at the moment, but I do not know all the details of that.

Mr. **Volkmer**. All right.

Thank you, Mr. Chairman.

The **Chairman**. Mr. Johnston from Florida. Any questions?

Mr. **Johnston**. No, sir.

The **Chairman**. Mr. Tanner of Tennessee.

Mr. **Tanner**. Thank you very much, Mr. Chairman.

This may have been asked and you may have touched on it. If you have, I apologize. But are there any specific efforts being made to coordinate among our various branches and agencies of government—an effort being made to coordinate as we try to participate in these discussions and are we speaking with one voice?

I know that in some of the other hearings I have attended, we do not seem to do very well at that in many cases.

Mr. **deVos**. In fact, that is exactly what is happening, Mr. Congressman, but I would ask my colleague, Mr. Johnson, to address that in more specific detail.

Mr. **Tanner**. Thank you.

Mr. **Johnson**. Yes, Congressman, there is a group which has been created under the auspices of the U.S. Trade Representative, which is in this area, but it is generally responsible for coordinating trade policy and also for leading trade negotiations.

So that under the auspices of USTR, there is an interagency group which does a number of things. First of all, it looks at new information which is being reported, both by our mission in Brussels, as well as by other embassies, about developments relevant to 1992 and the single market so that the USTR-led group takes that information, often comparing ~~notes~~ with the private sector, with industry, and sometimes even receiving industry information before it may come in from posts and then it attempts to analyze what does that information mean for us, what kind of policy implications might there be and ultimately makes some decisions and recommendations to more senior level bodies in the government, but can initiate conversations directly with the European Community, be it at the technical level or at the policy level.

So that we are working closely together. There are approximately 11 subgroups which have been created based on this USTR-led unit, to look at the various dimensions of the single market.

Mr. **Tanner**. That's encouraging. I guess this question is really in the nature of asking for an opinion. Probably no one has an answer.

Two or three weeks ago, I had the opportunity to go to western Europe with the Secretary of the Army's Quick Look program, and it was my impression, based on briefings and other observations I made, that Secretary Gorbachev is, for whatever reason, immensely popular in western Europe right now, maybe more so than he is in his own country.

Many have expressed the opinion that some of the moves that the Soviets are making now are in direct anticipation of what we are talking about this morning and the fact that the Soviets need to look to western Europe for trade, as well as science and technology and all the other things that we talk about emanating from this effort.

In your opinion, what do we need to do as a nation to protect ourselves against—is my question—in terms of the activities that the Soviets are engaged in now to court, so to speak, the European Community?

Mr. DEVOS. In the area of science and technology, it is true that there have been commercial and trade agreements between the eastern Europeans and the Soviet Union and western Europe, and I would ask my colleague, Mr. Dameron, to address those and the political aspects as well.

In the area of science and technology, we still coordinate very closely and will continue to coordinate very closely with the Europeans, western Europeans, through the COCOM mechanism, and I think that that—I do not foresee any change in that mechanism and I think it is been relatively successful up to this point.

Mr. TANNER. That is fine.

Mr. DAMERON. I can not think of anything to add to that that would answer more directly, I am afraid, your question. The relevant thing to remember is that within NATO, we are working to respond to this phenomena of Mr. Gorbachev's appeal.

On the strictly scientific side, there are rules and regulations, but these have to be fairly narrowly defined because within eastern Europe, we also, of course, have a policy, as do most of the Europeans, of cooperating with eastern Europeans where possible if it doesn't harm our strategic interests.

By using COCOM, by using NATO, we are able to, so far, maintain or policy and our unity. Of course, it is a question that you ask that we are addressing directly. The Secretary was there. We are not involved directly, any of us, in what he is addressing with his colleagues.

The CHAIRMAN. Has the gentleman concluded?

Mr. TANNER. Thank you, Mr. Chairman.

The CHAIRMAN. Thank you, Mr. Tanner.

You know—the Chair, before he calls on our next member, Mr. Shays, from Connecticut, would like to make the observation that it seems to me that you all preclude your comments and your answers on science and technology, the field of science and technology. That really is not the substance of this hearing.

The substance of the hearing is, what is the ramification of the combined marketplace as far as competitiveness—you mentioned that in your earlier statement, Ambassador, and where that is going.

We are not talking about arguing with them on quarks and that is not our point at all. What we are trying to get at is what does that economic place mean in Europe fundamentally as you see it affecting the economic dynamics of this country and our ability, therefore, to participate.

So I would like to kind of refocus on that. I am not talking about the issue whether we share the space program or we share the idea of superconductors of the superconducting super collider. We all understand that. What we are trying to get into focus today is the interrelationship, what happens in Europe as far as this country is concerned.

For example, Mrs. Thatcher does not look at this quite so brightly as we do in this country apparently. Yesterday, she made quite a formidable statement in Britain about her concern as to whether or not they are going to have a socialistic relationship as far as Belgium is concerned on the Common Market and what does that mean to Britain. She even went so far as to say that as far as she was concerned, they would be losing their sovereignty basically, is what she said. That has created quite a stir, as I am sure you are aware, in Britain.

So I do not think this love-in fest this morning—and please forgive me—I do not mean to be rude in any respect whatsoever—is focused on the point of science and technology. We know that. We do not need witnesses to tell us that.

I want to hear what you people are thinking as far as the international marketplace is concerned. How does the United States compete and do they compete? I am not so sure that some of the comments that are made today are dynamic enough, from this member's point of view.

Having said that to try to redirect this observation, the Chair now would recognize the distinguished gentleman from Connecticut, Mr. Shays.

Mr. SHAYS. Thank you, Mr. Chairman, I have no questions.

The CHAIRMAN. The Chair then recognizes the distinguished gentleman from Illinois, Mr. Fawell.

Mr. FAWELL. Thank you, but I have no questions either.

The CHAIRMAN. Mr. Fawell does not either.

Mr. Packard, from California.

Mr. PACKARD. Just one question. With the consolidation of the European market as proposed in '92, what are the pros for the United States? We often dwell on the negatives and the concerns, but what do we see in that process that we can really exploit, that will benefit the United States? What are the pros?

Mr. JOHNSON. Congressman, I will take a stab at striking a balance. I will focus first on the pros.

It is clear that a market within Europe which removes the internal constraints which often now inhibit goods moving or services moving from one country to another within the community.

Removal of those kinds of barriers is an advantage for U.S. companies, just as it is for those European companies that are trying to overcome these barriers.

Now, provided that we are able to gain access to that external market, that is, our concern has been that as these internal barriers come down, we want to make sure that there is no increase in external protection which would frustrate us in our efforts to break across that first hurdle which will be the key to the broader access within Europe, so that we think that not only companies that are invested in Europe, but also companies that are shipping to Europe, have much to gain. It makes a lot of sense for Europe to be a single market.

To the extent that there are economies of scale possible, Europe then begins to realize some of the advantages that the United States has long realized because it has not been subjected to the same kind of restrictions to internal commerce that the European Community has.

I might say that the jury is still out on whether the final outcome will, indeed, be an easier access for us or not. One of the reasons that we have organized ourselves, as I was mentioning earlier, is to try to make sure that we are sorting out what are the implications for us. We have had exchanges on things like banking and financial services, to try to make sure that, as those rules are set up, they do not disadvantage us, and that is why it is necessary, notwithstanding our basic optimism, to have an ongoing dialogue.

I do not think there is any single solution. We can not simply go to the European Community and expect they are going to tell us, yes, we are going to be open and we are not going to do anything that is going to disadvantage outsiders. We are going to have to be patient and look at the details and work with our companies in looking at the details and then, bit by bit, sit down and go through with the commission and with member states the various aspects of how this process is going to affect us.

So I think we have much to gain, but I think at the same time, we are not taking that for granted; that we are going to have to stay with this as a long-term exercise in piece-by-piece discussion, dialogue of the impact of each of these steps on U.S. companies.

Mr. **Packard**. As a follow-up, quick follow-up, what kind of leverages do you suggest that we consider to help move us toward a compatible, a more compatible effect as they implement '92?

Mr. **Johnson**. Well, there are a number of things we can do. First of all, early on, when it became apparent that a reciprocity standard was going to be applied in the banking sector, or looked as if it was going to be applied, we reacted. Folks went to Europe, sat down with officials in the European Community, as well as with some member-state officials, and discussed what the implications of that might be for us and expressed our unhappiness that reciprocity might become the standard there, and changes are beginning to be evidence in the European approach.

In another area, we have a multilateral negotiation under way in the GATT, which means that some of the issues that are under discussion, services trade, for example, is being negotiated now in Geneva, and so we think that those talks, those negotiations, the effort to arrive at a multilateral agreement that covers services, also provides some leverage on the European process. That is, it will help to push Europe not to close in on itself, but to adopt a more acceptable multilateral approach to drawing up the rules which are going to govern the European market.

The **Chairman**. Will the gentleman yield?

Mr. **Packard**. Be happy to.

The **Chairman**. Are the Europeans soliciting the reaction from the United States? I mean, do they set up some kind of a formal relationship between us as they are moving in this direction?

Mr. **Johnson**. No, Mr. Chairman. That has been a subject of some discussion. I must add, we did not set up such a mechanism and we were considering trade legislation on our own which had some impact on the Europeans as well. The Europeans have, at one stage, resisted a formal dialogue, but in fact, have accepted both technical-level talks, where we have technical-level experts that go to talk about issues like telecommunications and other issues that are issues the experts need to discuss.

In addition, a number of us have gone to Europe to sit down and talk through some of the policy issues, like sectoral reciprocity, with them. This has been an issue that has been engaged at cabinet and subcabinet level as well. So, in fact, there has not been—I think we—we feel that, by and large, we have relatively good access to the Europeans to present our case. Naturally, we would always like improvement, but I suspect they might as well.

Mr. PACKARD. That is all. Thank you, Mr. Chairman.

The CHAIRMAN. The Chair recognizes the distinguished gentleman from Idaho, Mr. Stallings.

Mr. STALLINGS. No questions.

The CHAIRMAN. No questions.

The Chair recognizes Mr. Browder from Alabama.

Mr. BROWDER. Thank you, Mr. Chairman.

I have one question I would like to direct to any member of the panel.

You know, small businesses have had an important role in high-technology development. Assuming that we realize what we have outlined here for Europe 1992, I think that will probably create some problems for small businesses in the field of high—especially in the field of high technology. Do you foresee a Federal role specifically designed to facilitate small business gaining access to the European market?

Mr. JOHNSON. Mr. Browder, I will comment briefly on that, but it is going to be a very inadequate comment, I am afraid.

I am not aware of any programs that are envisioned now which would go beyond the kinds of services that small business would be able to use in gaining access to the current European market. Similarly, I guess it is not clear to me that it is going to be any more difficult for a small business to access the community, but I will answer you in the only way I know, which is to say that I am not aware of any new programs. It is not clear to me that there is necessarily going to be a new need since the market may be somewhat easier for them to access, but I do not know of any new programs being created specifically for small businesses.

Mr. BROWDER. Well, I think you have answered my question. You personally do not see a need for any new Federal or expanded Federal role?

Mr. JOHNSON. Well, I would not say I do not see a need for any Federal role, but I think the Federal role would be to give small businesses access to all the information we have about how they might be affected by policy changes in the community and to help them through the foreign commercial service people that are in place in Europe. I guess what I am saying is that I think it is going to be existing resources, as opposed to new resources.

Mr. BROWDER. But a continued Federal role for—

Mr. JOHNSON. In that sense, yes.

Now, the Commerce Department, which is closer to the use of their foreign commercial attaches than I am, they may have something in mind that I am not privy to, but I do not know of any new program now.

Mr. BROWDER. Thank you.

Thank you, Mr. Chairman.

The **Chairman**. I thank the distinguished gentleman.

Let me ask just one question and then we want to thank you all for your efforts.

Tell me, how do you see the European situation developing, for example, let us say on anti-trust laws? The fundamental observation this committee has made over a period of time—and with certain applause as far as Europe is concerned—that there is an interrelationship between direct government participation, same as in Japan, what they are doing in different programs and different projects, HDTV and so forth and so on.

They are not subject to at least, they may be in some countries, but they are not subject to the anti-trust laws as we are in our own country which developed them for a purpose, as you know.

Query, what are they doing on those relationships? How do we compete there? Are they talking about anti-trust laws, do you think, amongst the countries or is it going to be totally open trade? What do they see?

Mr. **Johnson**. Mr. Chairman, I will start on that and see if others have comments to make.

The anti-trust situation differs—although I confess not to being an anti-trust expert—differs from country to country within the European Community. Now, to what degree we are going to see waivers of anti-trust provisions to allow greater cooperation between European companies is not altogether clear because you have had some very active folks in the competition portfolio within the commission who, if anything, have been trying to increase competition within the community.

So, as Peter was talking earlier about the kinds of programs and the percentage of community resources which are going into community-wide, that is, commission-sponsored research and development, which might involve some kind of waivers of anti-trust regulations, if you are allowing a wide variety of firms to cooperate, I am struck by the fact that I think it is not at all clear that you are going to see the allocation of large new resources to community-wide research programs.

I think that you are going to continue to see intense competition between member countries within the community for research dollars and there may well be the view in member countries that they would rather retain control over the expenditure of those dollars than have them flow to a central authority.

The question, I guess, that I see emerging, and I do not have an answer for it, is as you bring down the barriers and companies within Europe find it necessary to restructure to serve that larger market, are there going to be anti-trust concerns raised as you see an amalgamation of companies?

Again, so far, I do not have any indication that that is going to lead to what we would consider to be an anti-competitive situation for U.S. companies.

The **Chairman**. So basically what we are saying is we just do not know.

Mr. **Johnson**. I think the Europeans themselves at this stage do not know for sure. I do not think that they've really crossed that bridge.

The CHAIRMAN. That is what puzzles me. Why we have not looked into a point of view of a general overview as to what our policy relationships are. We are letting it evolve and maybe that—I do not know whether that is the right way or not.

What I am thinking about, for example, when we visited in the CERN operation, the superconducting supercollider—they are all participating, as you know—they told us, flat out, that the economic ratio is about five to one as far as the economic dynamics were concerned on that program and all of the materials, all of the technology, everything, all the hardware is being bought within Europe except for certain high-tensile steel from the Soviet Union and the crystals from China. Everything else is being—the only thing they buy from the United States that we are buying at that point was our technology as far as supercomputers were concerned.

Anything that they could orient towards Europe, Airbus and all different corporations, was supplied from Europe, anything whatsoever, with the exception of where we have the advanced technology was on supercomputers. The rest they are all buying in Europe.

What bothers the committee. Again, I have to reiterate to you our concern is not the debate on science and technology and what we do with quarks or this or that. That is not the issue. What we are trying to determine is what role does science and technology and space and education play in creating the new wealth of the nation, and how is Europe going to react to that?

I mean, I would like to hear what you think about Mrs. Thatcher's response? Good God, that was—she was very strongly—the Iron Lady made her point very clearly. What does it mean? Do you understand where I am coming from?

Mr. JOHNSON. I will offer a brief comment, if I may, Mr. Chairman.

I think, inevitably, this move toward a single market in Europe means a compromise of sovereignty. It means that European nations are being asked to one degree or another to give up some of their national control over some areas of their economy. They have already done some of that in forming the Common Market. Mrs. Thatcher and some others within the community have put down reservations as far as further monetary unity and other steps which they see as compromises of sovereignty that they are not prepared to make.

I think for us, what we need to be sensitive to is that this process of building a single market may or may not be completed in 1992; it may or may not proceed in a straight line. We simply have to sort out what our interests are and do everything we can to make sure that they are effectively represented as the process goes forward.

I do not think that it is going to be possible for us to second-guess just exactly when or how it is going to come to a conclusion.

The CHAIRMAN. Should we set up a special ambassador to the European Community on this issue as far as a much broader, high-level understanding of the United States Government, as far as they are concerned, on what happens in Europe at this point? Should we set up a coordination amongst the different cabinet-level positions in Commerce and State and Defense?

Should we relate to the issue that Gorbachev is developing as far as the eastern Europe is concerned, or should we just wait until it unfolds? That is what the committee is asking. What do you think?

Mr. JOHNSON. Well, my reaction, Mr. Chairman, would be that we have the machinery in place. I recall participating in negotiations regarding the last enlargement of the European Community when Spain and Portugal joined and we used the same mechanism. The trade stakes were comparable and I think we have now—we have the Economic Policy Council, we have cabinet-level—they are being provided information. They are knowledgeable on the subject. There are groups meeting. I think that the creation of new bureaucratic structures would tend to confuse the issue, rather than to clarify it.

I think it is also important that we look at 1992 in the broader context of everything else that we are trying to do in trade policy. How does what is happening in Europe in 1992 relate to our ongoing trade issues with Japan or with the countries of East Asia or to our own free-trade agreement with Canada?

I think it is critical that we use the mechanisms that we have got, push those mechanisms to inform us and give us policy guidance, but I would be skeptical about the utility of creating new mechanisms.

The CHAIRMAN. Do you see—one more question—do you see the European market situation altering the NATO relationships with the country, with our country?

Mr. JOHNSON. No. I will defer to Mr. Dameron on this, but I make one comment.

I think one of the areas where we need, and we will be continuing to do more work, is to look at the—not the trade and economic consequences—but the other consequences of a post-1992 Europe that might be different as a community and membership and different, not only in its relationships perhaps with eastern Europe, but perhaps with other members—with other countries in Europe, Austria, for example.

The Europeans themselves are not clear, I think, as to their intentions with regard to additional members. They feel they've got enough on their hands, I believe, in completing the single market. But these are areas that warrant our attention, though I do not see that they bring fundamental change, but I will defer to Mr. Dameron for additional comments on that.

Mr. DAMERON. No, Mr. Chairman, there is no fundamental change now, but of course you have rightly put your finger on something that we have to look at is a longer term issue. We do that. It may not be we can develop a policy today, but we do not know what is going to happen 10 years from now.

I would point out that the Single Act of the European Community which gave the impetus for the 1992 program very specifically gives the Community—not the Commission in Brussels but the Community itself—more authority to coordinate their political positions on various issues. It excludes coordination of military/defense issues, and it specifically says that none of their coordination shall interfere with the workings of the Atlantic alliance, NATO.

So they have the intention of not letting this interfere at all with NATO. To sit back and say that is going to be the case is simplistic.

Obviously, if you have a more united European voice, you are going to have Europeans talking to each other, and we have to—we have never had a problem.

We still coordinate within NATO on NATO issues, but when they start coordinating on political issues, where do you draw the line? That is going to be a problem. When you get into the defense trade area, you can have the same problems. We have not had any so far, but as you tear down the barriers, will these give rise to something that will make cooperation more difficult? We have not seen it yet, but we have to be alert for it. We study it, but it is hard to make an overall policy for something that is just so nebulous at this stage.

The CHAIRMAN. Any further questions?

If not, we want to thank the panel very much for being with us this morning. We have a series of written questions we will submit to you and request, if you will, a response. Thank you very much for being with us this morning.

Mr. DE VOS. Thank you, Mr. Chairman.

The CHAIRMAN. For our next group of witnesses we have Dr. Roy Ginsberg, European Community Studies Association, a professor of government from Skidmore College; we have with us Dr. Colleen Driscoll Sullivan, director of the Space Age Law and Policy Institute from Villanova University; and we have with us Dr. Joseph C. Rallo, Department of Social Sciences, Michigan Technological University in Michigan.

I think what we will do is bring all of you folks up, if you do not mind, and then we can have a chance to review your formal testimony and then get a chance to exchange views with you on your observations and the studies you have made.

Are we short one witness this morning? Is Dr. Sullivan here? Okay.

The chair recognizes Dr. Ginsberg.

[The biographical sketch of Dr. Ginsberg folloes:]

Biography of Roy H. Ginsberg

Professor Roy H. Ginsberg received his Ph.D. in political science from The George Washington University in 1985. He served in several posts in the Federal Government between 1977 and 1986, including duty at the Agriculture and Commerce Departments, Office of Management and Budget, and the U.S. International Trade Commission. In 1981-82, he was a research fellow at the Commission of the European Community. In 1986, Mr. Ginsberg joined the faculty of the Department of Government at Skidmore College where he teaches international relations. He is author of Foreign Policy Actions of the European Community: The Politics of Scale (Lynne Rienner, 1989) and is coauthor of The United States and the European Community in the 1990s: Partners in Peril (in progress). He is a member of the Executive Board of the European Community Studies Association and coeditor of its Newsletter. He is also active in the Council for European Studies, the American Political Science Association, and the International Studies Association. He speaks on U.S.-European relations before university and other audiences and is a consultant on European Community affairs.

STATEMENT OF DR. ROY GINSBERG, MEMBER, EXECUTIVE COMMITTEE, EUROPEAN COMMUNITY STUDIES ASSOCIATION, AND PROFESSOR OF GOVERNMENT, SKIDMORE COLLEGE, SARATOGA SPRINGS, NEW YORK

Dr. GINSBERG. Thank you, Mr. Chairman.

I am an assistant professor of government at Skidmore College and a member of the executive board of the European Community Studies Association. Skidmore is a four-year liberal arts college in Saratoga Springs, New York. The European Community Studies Association is a new national association of 250 members designed to promote the critical understanding of the European Community in the United States.

As a specialist in EC affairs, I am pleased to address the committee on the European Community's 1992 plan to eliminate barriers to trade and the implications of this for U.S. interests. I request that a longer version of my presentation be submitted for the record, Mr. Chairman.

The CHAIRMAN. If there is no objection, so ordered.

Dr. GINSBERG. Thank you.

The members of the European Community amended the Rome Treaty with a Single European Act in 1987. This commits the members to progressively eliminate physical, technical, and fiscal barriers to trade by December 31, 1992. The logic is stunning: to ensure free movement of goods, persons, services, and capital. The idea is to create a continental size market of 323 million people so that European businesses may exploit larger economies of scale and undertake cross-national business collaboration and R&D collaboration. These are conditions that a customs union should provide. The 1992 plan is a reaction to the low growth and high unemployment of the 1980's, a sluggish economic performance plagued by NTB's—nontariff barriers—that rob the European Community of the benefits of a customs union.

Ten years after the EC was created—that is, in 1968—the members eliminated all tariffs between and among themselves, a remarkable accomplishment, or so it seemed. Ever since, member governments have devised the craftiest ways to protect domestic industries and jobs from imported competition from other members using nontariff barriers. These nontariff barriers fragment the European market, robbing EC firms fuller access to a larger market.

Since the markets of the individual EC countries are too small for their firms to compete more effectively on a global scale, the adage "small is beautiful" will not permit the Europeans to catch up with their American and Japanese counterparts in the race for new technologies and industrial competitiveness. In addition, a fragmented market keeps the European firms from cooperating with one another across frontiers on R&D projects. Wasteful duplication of R&D on 12 national levels explains why the Europeans are lagging behind the Americans and Japanese in developing and more quickly exploiting new technologies.

The irony of the 1980's for the EC is that the NTB's that member governments thought would protect their domestic industries and economies from imported competition ended up depriving the European firms of the benefits of a customs union—free trade, free of tariff barriers and nontariff barriers.

The plan entails passage of 279 directives governing new standards of production. The directives are drawn from a blueprint for the 1992 program known as the White Paper on Completing the Internal Market. The white paper was approved by the EC members in 1985 and incorporated into the Single European Act.

Proponents of the plan argue that if the NTB's are approved we will see prices fall for intra-EC trade in goods and services as competition stiffens and, as the previously closed public procurement markets open to EC-wide competitive bidding. The volume of production of goods and services would rise, a continental size market would replace 12 separate national markets enabling member firms to collaborate cross-nationally in order to meet foreign competition, cost of production would drop as larger economies of scale are realized, and technological innovation in the financing of costly and risky R&D projects would also develop.

As of April 1989, of the 279 directives, 232 have already been proposed by the European Community's Commission to the European Council that makes the decisions. There are only 47 directives left that need to be proposed and sent forward. Of the 232 draft directives, 113 have already been adopted, 14 have been agreed upon by the Council and are awaiting the second reading of the European Parliament, and 5 have been adopted in part by the European Council.

Although the Council voting record is behind schedule, the voting procedure under the terms of the Single European Act has helped to hasten the pace of the EC's legislative agenda. On nearly all aspects of the program, the EC Council may vote on directives on the basis of a weighted majority rather than on the basis of unanimity.

You must realize, Mr. Chairman, that in the past these kinds of decisions were taken on the basis of unanimity so that any one member country could veto Community action. That is not the case in the 1992 plan. No one country or no block of countries—for instance, all the large countries or all the small countries—can block a decision. Fiscal harmonization and free movement of labor, however, are still subject to votes of unanimity and thus will be more difficult to achieve.

Prospects that the EC will achieve many of its goals are fair. The 1992 plan is a process of integration that predates 1992 and postdates 1992. In fact, 1992 is a rather arbitrary and meaningless date because, in essence, the Community's integration process will continue after that, and although the European Community will not meet all its goals by 1992, it may very well meet many of them later in the nineties.

Please realize that the plan's purview is restricted to eliminating barriers to trade, such as production standards, as well as more controversial areas. The Community is trying to narrow differences to mutually recognize levels—for example, in the case of excise taxes. But the program does not extend to monetary union, the program does not extend to economic unification, so realize that without a common currency, without coordination of economic and fiscal policy, the customs union will still be fragmented, and efforts to fix exchange rates, increase the usage of the ECU—the European Currency Unit—and oversee macroeconomic policy are under way and thus represent a momentum of cooperation in areas linked to, but not legally under, the Single European Act.

Among the many sectors that are due to be liberalized under the 1992 program, I would like to briefly focus on public procurement, financial services, and R&D in science and technology, because they promise to contribute to the EC's goal of becoming more industrially and technologically competitive.

The European market for high-tech products, particularly telecommunications and defense, has been fragmented into less efficient small and medium size markets whose governments protect national champions from outside competition through preferential public procurement contracts. Closed public procurement tendering raises the costs for consumers and governments as cloister producers do not have the incentive to reduce prices. Indeed, public procurement competition is nearly nonexistent at the EC level. Only 2 percent of all public procurement contracts in the European Community members are awarded to firms from other members of the European Community.

According to Paulo Cecchini, he has estimated that in 1986 total public purchasing amounted to $626 billion, or 15 percent of the European Community's gross domestic product. The Commission of the EC is proposing to open public purchasing to intra-EC competition. Its goal over the long term is to open 80 percent of public contracts to EC-wide competition. Foreign firms would have access to this new public procurement market insofar as their home governments provide reciprocal access to EC firms. As public procurement preferences cut deeply into national traditions and prerogatives, one should not expect change to occur very quickly in the European Community.

Financial services: This sector takes up to 7 percent of the EC's gross domestic product, yet government regulations have hindered financial institutions from setting up in other member states or providing services there. As a result, competition and cost efficiency are lost in small national markets. Again, Paulo Cecchini shows significant potential gains to be made from introducing cross-frontier competition in the financial services market.

The Commission is proposing liberalization of the financial services market by 1993, a market, it suggests, where a bank can offer a full range of its services throughout the EC and set up branches in another member state as easily as in its own, where insurance can be bought on the most reasonable terms and be valid throughout the EC, and where the market for securities and capital is of a size sufficient to meet the financing needs of European industries and to attract investors from all the member states.

The implications of opening up financial services to European competition are stunning. Providing venture capital needed to finance the EC's drive for economic growth and for industrial renewal is critical if the EC is to meet its 1992 goals.

The 1992 program is already having a major impact on the EC's high-tech sectors, with moves toward mergers and company reorganizations to meet the new competition. The electronics, aerospace, and telecommunication industries are entering into joint ventures and collaborative R&D projects across state frontiers, likely to avoid duplication of research and overcome the reticence to enter into cross-frontier business collaboration that existed in the past.

Existing EC science and technology research programs are being renewed and expanded. The Single European Act commits the EC to strengthen the scientific and technological bases of European industry in order to become more competitive on a global scale. Members are committed to forge cross-national R&D, R&D through an EC program to provide a framework for the EC's objectives in science and technology to open up public procurement contracts. This should avoid wasteful duplication of research at the separate national levels and overcome reticence to cooperate between businesses throughout Europe.

Mr. Chairman, I would like to move on briefly to the impact on the outside world. As the world's largest trader, the world's largest importer and exporter, the Community has a very, very deep stake in international trade. Therefore, I believe that concerns about "fortress Europe" should be allayed as the EC has too much at stake in international trade to become protectionist. There are enough anti-protectionist forces in the European Community to balance the protectionist forces, and the EC is bound to international trade rules and the certainty of retaliation should it take action that harmed nonmembers, particularly nonmembers that have the power to inflict retaliatory harm on the European Community.

Ironically, the 1992 plan is designed to provide opportunities for EC firms to garner larger shares of the EC market and thus become more globally competitive. Yet, to achieve this, the EC must permit nonmember firms to have access to this enlarged market. If the EC restricts imports, its exports will suffer as nonmembers would retaliate.

This said, the EC is neither monolithic nor magnanimous. While there appears to be general support for the 1992 plan, political opposition and businesses and workers that stand to lose sales and jobs under new competitive conditions could delay completion. The EC's purpose is to make EC firms more competitive and promote market expansion for them. Thus, the EC is not eager to give a free lunch to nonmember firms whose home governments do not give EC firms reciprocal or national treatment in their markets.

Mr. Chairman, the impact on U.S. business interests. As the EC economy expands, so too should U.S. sales if U.S. firms can compete under the new market conditions. U.S. firms will no longer have to adapt production to separate standards of 12 states but to those of the European Community. U.S. firms producing in the EC will have an advantage over those without a presence there.

Many U.S. firms in the EC are considered European as they generate jobs and state revenues in Europe. They also have opportunities to influence the draft directives before enactment and then can make timely adjustments. In addition, they should also have wider access to competitive bidding for public contracts should the EC's $600 billion public procurement sector be opened up.

The 1992 plan is likely to produce more opportunities than costs for U.S. industry. Problems related to the program, I believe, are likely to pale in comparison to the myriad of existing unresolved trade disputes that plague U.S.-EC relations—industrial policy, export credits, farm subsidies, technological transfers. We have problems with the European Community that predate 1992, and I believe that if we do not resolve some of these disputes before 1992 they will provide a very bleak backdrop to the 1992 program as its effects are felt and compounded in the mid-nineties.

Interestingly, when we view the 1992 program from this side of the Atlantic, we must realize that what the Europeans are trying to do is based on the model of the United States economy. However flattering that might be, some negative implications of 1992 for U.S. businesses must be addressed. U.S. firms without a European presence by 1983 may find it much harder to enter the EC market. European firms will take larger shares of that market and will already have adapted to new industrial standards. U.S. domestic firms will also have to prepare for new competition here in the United States and in other third-country markets as European firms, empowered by the benefits of the 1992 program, increase their share of foreign markets.

For U.S. business in general, the problems of the 1992 program reside in controversial decisions that the EC will soon be taking on rules of origin and local content, access to public procurement, and social obligations of employers toward workers. Since I am using up a lot of my time, Mr. Chairman, I hope to be able to discuss those problem areas in more detail in the question and answer period.

I would like to briefly move on to the impact of 1992 on U.S. foreign policy and security policy. The 1992 program is likely to strengthen the EC economy. Thus, the Europeans will be in a stronger position to provide a larger share of their own defense needs at a time when the U.S. will be preoccupied with its own debt. Opening up a public procurement in the member states' defense industries could help promote standardization of military equipment long needed among the NATO members, and may I add that all EC members are in NATO except Ireland. If these countries are ever to operate effectively in wartime, they need to have more standardization of military equipment.

The Single European Act also commits members to formulate and execute EC foreign policies and calls on them to maintain the technological and industrial conditions necessary for their security. Thus, the program is likely to strengthen the EC's increasingly independent foreign policy activities from Central America in our own backyard to Eastern Europe, to Southeast Asia, thus continuing to create needs for U.S. policy adjustment in West-West relations.

U.S. national interests would be advanced by a more proactive approach to the EC, by which the U.S. Government would work with U.S. businesses and EC authorities to make its wishes known before the directives are enacted.

I believe, Mr. Chairman, that the commercial aspect of U.S.-EC relations should not, however, dominate U.S. interests. Given the central importance of a strong and viable Western Europe to U.S. foreign policy and security interests, a balanced approach to U.S.-EC relations, with the U.S. taking into account the broader constellation of ties, should be pursued.

In conclusion, the program's 1992 deadline will not be met due to the many obstacles, such as opposition to fiscal policy harmonization and public procurement liberalization. These areas cut deeply into state sovereignty. In addition, we may see unforeseen developments, such as an oil cartel action or a recession, that could slow down the integration process in Europe.

However, missing the deadline is not too significant as the plan is a process that will continue throughout the nineties. The net result will be an EC that will more closely resemble a customs union, a customs union on its way to becoming a common market, but nothing of the kind of economic union based on the U.S. model to which the European federalists aspire.

I think I will stop at this time, Mr. Chairman. Thank you.

[The prepared statement of Dr. Ginsberg follows:]

Testimony of Roy H. Ginsberg
Assistant Professor of Government, Skidmore College
Member of the Executive Board, European Community Studies Association
on
The Political and Economic Implications of the European Community's 1992 Plan for United States-European Community Relations

Before the House Committee on Science, Space, and Technology
May 16, 1989

Executive Summary

- The European Community (EC) is committed to eliminating or reducing barriers to internal trade by the end of 1992 in order to create a single continental-size market for EC firms to exploit larger economies of scale, pursue crossnational R&D and business collaboration, and thus compete globally with more success. Enactment in 1987 of the Single European Act, an amendment to the Rome Treaty, governs the passage from a fragmented to a unified customs union.

- Of the 279 directives to govern liberalization of the EC market, 232 drafts have been proposed by the Commission to the Council: 113 have been adopted and 14 have been approved by the Council but are awaiting Parliamentary scrutiny before final passage.

- Prospects that the EC will achieve many of its goals are fair. The 1992 plan is a process of integration that predates and will postdate 1992. The plan's purview is restricted to eliminating barriers to trade such as production standards--a process of harmonization. For the controversial areas, such as excise taxes, the EC is content to narrow differences to mutually recognized levels--a process of approximation. The program does not extend to monetary and economic unification. Yet without a common currency and coordination of economic and fiscal policies, the customs union will still be fragmented. Efforts to fix exchange rates, increase usage of the European Currency Unit, and oversee macroeconomic policy are underway and thus represent a momentum of cooperation in areas linked to, but not legally under, the Single European Act.

- Ironically, the 1992 plan is designed to provide opportunities for EC firms to garner larger shares of the EC market and thus become more globally competitive; yet to achieve this, the EC must permit nonmember firms to have access to the enlarged market. If the EC restricts imports, its exports will suffer as nonmembers would retaliate.

- This said, the EC is neither monolithic nor magnanimous. While there appears to be general support for the 1992 plan, political opposition and businesses and workers that stand to lose sales and jobs under new competitive conditions could delay completion. The EC's purpose is to make EC firms more competitive and promote market expansion for them. The EC is not eager to give a "free lunch" to nonmember firms whose home governments do not give EC firms reciprocal or national treatment in their markets.

- As the EC economy expands so too should U.S. sales if U.S. firms can compete under the new market conditions. U.S. firms will no longer have to adapt production to separate standards of twelve states but to those of the EC. U.S. firms producing in the EC will have an advantage over those without a presence. Many U.S. firms in the EC are considered European as they generate jobs and state revenues. They also have opportunities to influence draft directives before enactment and then make timely adjustments.

- As the logic of the 1992 program points to a decline in prices for intra-EC traded goods and services due to the removal of border controls, nonmember firms are likely to witness a rise in intra-EC imports over extra-EC imports. Further, all U.S. domestic firms will face stiffer competition from EC firms in the U.S. and other markets as the Europeans, empowered by the 1992 plan, expand sales abroad.

- For U.S. business in general, problems reside in controversial decisions that the EC is expected to take on rules of origin and local content, access to public procurement under new EC rules, and social obligations of employers toward workers.

- Despite emergent problems, the flow of investment and trade between U.S. and EC multinationals is so mutually advantageous that notions of Fortress Europe are not viable. The question is to what extent will specific problems that arise be handled in mutually acceptable ways.

- The 1992 plan is likely to produce more opportunities than costs for U.S. industry. Problems related to the program are likely to pale in comparison to the myriad of existing unresolved trade disputes that plague U.S.-EC relations: industrial policy, export credits, farm subsidies, and technological transfers.

- The 1992 program is likely to strengthen the EC economy. Thus the Europeans will be in a stronger position to provide a larger share of their own defense needs at a time when the U.S. will be preoccupied with its own debt. Opening up of public procurement in the member states' defense industries could help promote standardization of military equipment--long needed among NATO members (all EC members are in NATO except Ireland) if they are ever to operate effectively in war-time. The Single European Act commits members to formulate and execute EC foreign policies and calls on them to maintain the technological and industrial conditions necessary for their security. The program is also likely to strengthen the EC's increasingly independent foreign policy activities from Central America to Eastern Europe to South-East Asia, thus continuing to create needs for U.S. policy adjustment in West-West relations.

- The 1992 program is already having a major impact on the EC's hi-tech industries with moves toward mergers and company reorganizations to meet the new competition. The electronics, aerospace, and telecommunications industries are entering into joint ventures and collaborative R&D projects across state frontiers likely to avoid duplication of research and overcome the reticence to enter into cross-frontier business collaboration that existed in the past. Existing EC science and technology research programs--its information technology program (ESPRIT), its communication technology program (RACE), its industrial technologies program (BRITE), and its 5-year $6.6 billion framework program to coordinate R&D--are being renewed and expanded.

- U.S. national interests would be advanced by a more proactive approach to the EC, by which the U.S Government would work with U.S businesses and EC authorities to make its wishes known before directives are enacted. The commercial aspect of U.S.-EC relations should not, however, dominate U.S. interests. Given the central importance of a strong and viable Western Europe to U.S. foreign policy and security interests, a balanced approach to U.S.-EC relations with the U.S. taking into account the broader constellation of ties should be pursued.

- The program's 1992 deadline will not be met due to many expected obstacles, such as opposition to fiscal policy and procurement which cut deep into state sovereignty, and unforeseen developments, such as an oil cartel action or recession. Missing the deadline is not significant as the plan is a process that will continue throughout the 1990s. The net result will be an EC that will more closely resemble a customs union, a customs union on its way to becoming a common market, but nothing of the kind of economic union, based on the U.S. model, to which European federalists aspire.

Testimony of Roy H. Ginsberg
Assistant Professor of Government, Skidmore College
Member of the Executive Board, European Community Studies Association

on

The Political and Economic Implications of the European Community's 1992 Plan for United States-European Community Relations

Before the
House Committee on Science, Space, and Technology
May 16, 1989

Mr. Chairman, I am Roy Ginsberg, Assistant Professor of Government at Skidmore College and a member of the Executive Board of the European Community Studies Association. Skidmore is a private, four-year liberal arts college of 2200 students in Saratoga Springs, New York. The European Community Studies Association is a national organization of 250 members who come from a wide variety of professions to promote the critical understanding of the European Community in the United States. As a specialist on European Community affairs, I am pleased to address the Committee on the European Community's 1992 plan to eliminate barriers to its internal trade and its implications for U.S. interests and U.S.-European Community relations.

The 1992 Program and its Intended Impact on the EC Economy

The members of the European Community (EC) amended the Rome Treaty with the Single European Act in 1987 which commits members to progressively eliminate physical (customs delays), technical (production standards) , and fiscal (differing excise duties) barriers to internal trade by the end of 1992 in order to ensure free movement of goods, persons, services, and capital. The intent is to create a single continental-size market of 323 million people so that businesses may exploit larger economies of scale and undertake crossnational business and research/development collaboration--conditions that a customs union should provide. The result should be more competitive European firms in markets at home and abroad. The 1992 plan is a reaction to the low growth and high unemployment of the

1980s, a sluggish economic performance plagued by non-tariff barriers (NTBs) that robbed the EC of the benefits a completed customs union should have provided. The plan entails passage of 279 directives governing new standards of production. The directives are drawn from a blueprint for the 1992 program known as the White Paper on Completing the Internal Market. The White Paper was approved by the EC members in 1985 and incorporated into the Single European Act. The logic of the 1992 plan is powerful. Proponents of the plan, such as Paolo Cecchini in The European Challenge 1992 (Gower, 1988), argue that if NTBs are removed:

- prices will fall for intra-EC trade goods and services, as competition stiffens and as the previously closed public procurement market opens to EC-wide competitive bidding;
- consumer demand will increase;
- the volume of production of goods and services will rise;
- intra-EC imports will rise over extra-EC imports;
- a continental-size market will replace twelve separate national markets enabling member firms to collaborate crossnationally in order to better meet foreign competition;
- the costs of production will drop as larger economies of scale are realized;
- competition will increase, causing firms and industries to restructure, leading to technological innovation and the financing of costly and risky R&D projects;
- exports will expand as firms will have strengthened capacity to take on foreign competition;
- number of new jobs will rise in the medium-term after an initial loss of jobs;
- professional and business mobility will increase; and
- crossnational business collaboration and joint ventures and R&D projects will increase, replacing national with European projects avoiding duplication

Four areas--public procurement, financial services, indirect taxation, and research and development in science and technology--warrant scrutiny here as their liberalization would revolutionize the European market.

The European market for hi-tech products, particularly telecommunications and defense, has been fragmented into less efficient small and medium-size markets whose governments protect "national champions" from outside competition through preferential public procurement contracts. Closed public procurement tendering raises costs for consumers and governments as cloistered producers do not have the incentive to reduce prices. Indeed public procurement competition is nearly nonexistent at the EC level. Only two percent of all public procurement contracts in the EC members are awarded to firms from other member states. Cecchini estimated that in 1986 total public purchasing amounted to $626 billion or 15 percent of the EC's GDP. The EC Commission is proposing to open public purchasing to intra-EC competition. The Commission's long-term goal is to open 80 percent of public contracts to EC-wide competition; foreign firms would have access to this new public procurement market insofar as their home governments provided reciprocal access to EC firms. As public procurement preferences cut deeply into national traditions and preogatives, one should not expect change to occur very quickly.

Financial services take up to 7 percent of the EC's GDP, yet government regulations have hindered financial institutions from setting up in other member states or providing services there. As a result, competition and cost efficiency are lost in small national markets. Cecchini shows significant potential gains to be made from introducing cross-frontier competition in the financial services market. He estimates that benefits to consumers could result in a one-time gain of approximately $26 billion. The Commission proposes liberalization of the financial services market by 1993, a market where a bank can offer full range of its services throughout the EC and set up branches in another member state as easily as in its own, where insurance can be bought on the most reasonable terms and be valid throughout the EC, and where the market for securities and capital is of a size sufficient to meet the financing needs of European industries and to attract investors from all the member states.

Harmonization of indirect tax rates is needed to remove obstacles that distort free trade rooted in the members' variations in excise taxes and VAT. The EC Commission proposes to collapse indirect taxes and excise taxes into predetermined bands. Instead of having frontier collections, taxes would be collected through a clearing system. As the question of tax rates hits a raw chord with sovereign states covetous of their power to raise fiscal resources, much opposition will be encountered.

The Single European Act commits the EC to strengthen the scientific and technological bases of European industry in order to become more competitive on a global basis. Members are committed to forge crossnational R&D, promote R&D through an EC program to provide a framework for the EC's objectives in science and technology, and open up public procurement contracts. The 1992 program is already having a major impact on the EC's hi-technology industries by the moves toward mergers and company reorganizations to meet the new competitive environment. The electronics, aerospace, and telecommunications industries, for examples, are undertaking joint ventures and collaborative R&D projects across national frontiers. The result should avoid wasteful duplication of research at the separate national levels and overcome the reticence to enter into cross-frontier business collaboration that existed in the past. Existing EC science and technology research programs, such as its information technology program (ESPRIT), its communication technology program (RACE), its industrial technologies program (BRITE), and its five-year $6.6 billion framework program to help coordinate R&D are all being renewed and expanded.

Implementation of the Program as of April 6, 1989

Of the 279 directives, 232 draft directives have been proposed by the EC Commission to the EC Council, leaving 47 directives to be proposed and sent forward. Of the 232 draft directives, 113 have been adopted, 14 have been agreed upon by the EC Council and are being given a second reading by the European Parliament, and five have been adopted in part by the EC Council. Although Council voting is behind schedule, voting procedure under the terms of the Single European Act has helped to hasten the pace of the EC's legislative agenda. On nearly all aspects of the 1992 program, the EC Council may vote on directives on the basis of a weighted majority rather than unanimity. The four largest members, France, the U.K., Italy, and West Germany have 10 votes; Spain, 8; Belgium, Netherlands, Greece, and Portugal, 5; Denmark and Ireland, 3; and Luxembourg 2. Thus the largest countries cannot together block a decision, nor can the smallest. Fiscal harmonization and free movement of labor are still subject to votes of unanimity and thus will more difficult to achieve.

Impact on the Outside World

As the world's largest importer and exporter, the EC has a deep stake in international trade. Concerns about "Fortress Europe" should be allayed as (A) the EC--the world's largest market and trader--has too much at stake in international trade to become protectionist; (B) there are enough antiprotectionist forces within the EC to balance the protectionist forces; and (C) the EC is bound to international trade rules and the certainty of retaliation should it take action that harmed nonmembers, particularly those that have the power to inflict harm.

There is an irony in the 1992 program. The program is designed to provide opportunities for EC firms to garner larger shares of the EC market. In order to achieve this goal, the EC must permit nonmember firms access to the enlarged market. If the EC restricts imports, its exports will suffer as nonmembers will take retaliatory action. Nonmember sales are a necessary evil.

Two caveats are worthy of mention: (A) by lowering production costs and increasing competitiveness, the EC is likely to increase its own share of the EC import market, thus making it more difficult for outsiders to export to the EC; and (B) as the primary purpose of the 1992 plan is to help make EC firms more competitive and to promote expansion of the EC market for them, the EC is not anxious to give a "free lunch" to nonmember firms whose home governments do not give EC firms reciprocal treatment or national treatment. Reciprocal treatment is roughly comparable treatment, although there are two types: diffuse reciprocity, which seeks an overall balance of trade concession, and specific reciprocity which calls for a "tit-for-tat" approach to the exchange of trade concessions. National treatment is the notion that the EC can expect, say, Canada, to give EC firms doing business in Canada the same treatment Canadian firms receive in Canada. We thus can expect the EC to demand reciprocity or national treatment of its trading partners.

Positive Impact on the United States Business Interests

The EC is the largest trading and investment partner of the United States. The EC is the largest market for U.S. exports of computers and computer parts, computer software, aircraft, semiconductors, scientific instruments, coal, and agricultural products. An expanding European economy after 1992 should have a corresponding effect on the growth of U.S. sales in the EC. No one knows how much of the increased consumer demand will be met by imported over domestically produced goods. EC member firms and foreign firms in the EC are best situated to take part in the expected market expansion if they can compete under the new conditions. Many U.S. firms already exporting to the EC or planning to do so will benefit from the EC's new common industrial standards (rather than having to cope with twelve separate sets of standards). Firms already manufacturing in the EC will be first among American firms to benefit after 1992. These firms--which are considered European--have had the opportunity to influence the drafting of directives and to make necessary adjustments and should have wider access to competitive bidding for public contracts should the EC succeed in liberalizing the public procurement sector--worth about $600 billion.

The flow of investment and trade between U.S. and EC multinationals is so mutually advantageous--and transatlantic interdependence so tightly knit--that notions of "Fortress Europe" or "Fortress America" are not likely scenarios. The question is to what extent will EC policies influence the flow of trade and investment and to what extent will specific problems that arise be handled in mutually acceptable ways.

The 1992 program is likely to produce more opportunities than costs for U.S. industry. The problems that the 1992 program will produce pale in comparison to the myriad of preexisting unresolved trade disputes that plague U.S.-EC relations, including industrial policy, export credits, export subsidies, farm subsidies, and technological transfers. Should the disputes over AIRBUS subsidies, meat hormones, and farm export subsidies fail to be resolved in the very near future, either bilaterally or through the GATT, they will together provide a very bleak backdrop to the 1992 program as its effects are felt and compounded in the mid-1990s.

Negative Impact on U.S. Business Interests

U.S. firms without a European presence by 1993 may find it much harder to enter the EC market. European firms will take larger shares of that market and will have already adapted to new industrial standards. U.S. domestic firms will have to prepare for new competition in the United States (and third country markets) as European firms, empowered by the benefits of the 1992 program, increase their share of foreign markets.

For U.S. business in general, the problems of the 1992 program reside in controversial decisions the EC will soon be taking on rules of origin and local content, access to public procurement, social obligations of employers toward workers, and import restrictions on goods from countries other than the U.S. but with trade diversion consequences for the U.S.

Rules of origin and local content--the amount of a product that must be produced in the EC to be considered sufficiently European and thus exempt from import restrictions or eligible to qualify for public procurement contracts under future EC-wide rules governing this area--could affect U.S. firms.

Should the EC achieve the opening up of public procurement among the member governments, it will demand of the United States reciprocal or national treatment ~~of~~ for its firms attempting to gain access to U.S. public procurement. The EC Commission directive on public procurement would impose a 50 percent local content requirement for non-EC firms. It also proposes to extend rules on public procurement to sectors not currently covered by GATT rules: telecommunications, water, energy, and transportation. Without international obligations governing procurement in these areas, the EC will demand reciprocity or national treatment of foreign firms wishing to gain access to the EC market. If or until the GATT includes these sectors under its rules for public procurement, the EC is not obliged to grant nonmember firms automatic and unilateral access to the benefits of the liberalized public procurmeent market. The EC will likely negotiate bilateral deals with trading partners in lieu of a GATT accord in order to open up procurement in these sectors to foreign bidding.

As the Single European Act and the White Paper both give short-shrift to workers' rights and benefits under the rubric of the 1992 plan, a "social dimension" could oblige all employers in the EC to meet certain obligations, thus raising the cost of doing business in Europe for U.S. businesses there.

Finally, U.S. business interests could be negatively affected by the imposition of EC antidumping duties, import quotas, and voluntary restraint agreements on products from other countries. U.S. firms are not normally affected by EC import restrictions. Japan, for example, may choose the U.S. market to invest in a manufacturing plant to produce a good for export to the EC--a Japanese-produced good on which the EC has already placed an import restriction (in reality Japanese investment in California resulted in the production of Ricoh photocopiers for export to the EC--Japanese produced machines on which the EC placed restrictions due to a dumping complaint. The U.S. Government viewed these Ricoh machines as American-built products based on sufficient local content). If the EC determines that the Japanese manufacturer is attempting to circumvent EC import restrictions by producing the same product elsewhere and then exporting it to the EC--and that the majority of the components of that product were actually produced in Japan and assembled in the third country--then the EC may extend its import ban to that product as well. Disputes would then arise between the EC and other countries who happen to host Japanese investment. Finally, EC import restrictions could cause trade diversion away from Europe to the United States, thus flooding the U.S. market with products intended for the EC yet unwanted in the United States.

Impact on U.S. Foreign Policy and Security Interests: Some Policy Prescriptions

The process of economic unification has been a policy goal of the United States since the founding of the EC in the 1950s. The EC has come of age. It is no longer the dependent of the United States. A more economically unified EC is a more potent competitor of the U.S. in European, American, and third country markets. A more unified internal market will likely raise EC self-confidence in dealing with political issues. As the EC continues to grow into a well-formed bloc in civilian international relations, the U.S.-EC relationship will change as well. More trade and foreign policy disputes will dominate the bilateral agenda in the 1990s as the EC moves into more areas subject to differences with the United States. Trade disputes over AIRBUS and farm subsidies and foreign policy disputes over Central America, the Middle East, and East-West relations will be more pronounced in the 1990s as the EC gains the confidence to stand firm on the issues in which its members have large stakes. The 1992 program will not allow U.S.-EC relations to remain in a policy time-warp. Adjustments will have to be made to better manage the world's largest two-way trade and investment partnership.

The international system of the 1990s will be even more conducive to the rise of EC economic and political power with major implications for U.S.-EC relations. The premium in international relations in the 1990s will be on economic interdependence and civilian foreign policy action rather than on military action, if the current course of improved East-West relations is sustained. As the EC strengthens economically it will have further opportunities to be involved in the mainstream of international economics and politics. Thus, achievement of the internal market will come at a time when the international system, with its premium on what political scientists use to call "low politics," is very conducive to civilian actors and their policy actions.

This scenario then is a "double whammy" for the United Sates (unless the U.S. shifts strategy and makes adjustments). First, U.S. predominance in the western capitalist world is challenged by the world's premier civilian powers--the EC and Japan. Second, U.S. predominance in the international system is challenged by the EC and other international actors. The simultaneous rise of EC economic power (and thus political influence) in the world and of the post-war international system form a new and powerful set of changes in U.S.-Ec relations.

As detente between the two halves of Europe leads to increased exchanges of goods, services, labor, capital, and technology, alternative security arrangements might develop, arrangements that put less emphasis on military force and more emphasis on political relations. Opportunities exist to reverse the arms race and the military orientation of technology.

There seems to be an intersection between the goals and objectives of the 1992 program, the EC' s desire to forge ties with Eastern Europe (which it views as a natural trade partner), and West German ostpolitik on the one hand, and the goals and objectives of perestroika, new thinking in Soviet foreign policy, and political reforms throughout Eastern Europe, on the other hand. The intersection of ostpolitik and westpolitik produce a powerful combination of historical, economic, and political forces that threaten to tear at the contours of U.S. security policy in Europe.

The EC members are more confident of their military technology and defense potential than at any time since 1945. New East-West relations in Europe and the prospects for a jump in intra-European trade have already changed the context in which U.S. policy on technology transfer control develops. During the last half of 1988, leaders of the FRG, Italy, UK, and France paid visits to the Soviet Union, signed agreements including those governing exports of high-tech products, opened lines of credit in the billions of dollars, and began to cooperate with regard to joint business ventures and industrial projects. Gorbachev has paid a return visit to the UK in 1989 and will do the same to the FRG, Italy, and France to pursue his plans to achieve a "common European home."

The 1992 process is occurring at a time when Western European Union (WEU) is being partially revived, when Franco-German military cooperation is thriving, when Spain has joined the WEU, when questions about the achievement of European security through the U.S. commitment to defend Western Europe through NATO is being questioned, as the U.S. and EC members wage disputes in COCOM over what high-tech products can and cannot be exported to the Soviet bloc, and when the Soviet military threat to Western Europe appears to have susbided. As the EC grows more confident in its military technology and as public procurement in the defense sector liberalizes, European defense cooperation in WEU is likely to increase. Indeed as the EC achieves economic strength and independence from the completion of the internal market, it will recognize the need to complement the economic achievements with military security cooperation that can only further enhance the EC's overall independence. WEU is a logical starting point. The EC cannot achieve full indepedence from the United States by completing the internal market alone. It must be complemented by some form of viable and credible common defense policy.

The U.S. Government has already stated its general support for the 1992 program so long as U.S. business interests are not adversely affected. As the interagency task force on the 1992 program further institutionalizes, it could help coordinate U.S. policy. Completion of internal reports of the Executive Branch on the 1992 program should enable policymakers to make more informed decisions. The U.S. Department of Commerce's inventory of EC directives on the 1992 program is a valuable source of information for U.S. businesses and thus reflects the importance of the Federal Government as a central clearing house for information.

Claims by the U.S. Secretary of Commerce that the U.S. should have a seat at the negotiating table during EC deliberations on the 1992 directives are counterproductive because we would not afford the Europeans the same treatment when we deliberate. It would be more effective if U.S. Administration officials would work more closely with affected U.S. businesses in obtaining drafts of EC Commission proposals on the directives that remain to be acted on to have the opportunity to make needs known to EC authorities at all appropriate levels before the drafts are finalized. It appears certain that some U.S. businesses are able to move more quickly than the U.S. Government in obtaining copies of draft directives and making their needs known to the EC Commission. Collaboration between U.S. businesses and the U.S. Government is thus necessary in order for the two to help one another in the pursuit of U.S. interests. The EC Commission has had a history of being open to input from sectors that are affected by its decisions and indeed often depends on industry expertise before decisions are made.

All said and done, the U.S. still lacks an overall framework for the conduct of its relations with the EC. Lack of an assistant secretary of state for European Community affairs at the U.S. Department of State underlies this point. Emergence of the new European Community in the 1990s and beyond requires a rethinking of the basic assumptions, principles, and standard operating procedures as theypertain to U.S. relations with the EC. To the extent that interagency deliberations and the impact of internal studies in the Executive Branch will help achieve a rounded approach remain to be seen. This rethinking should not take years lest opportunities for more effective U.S. policy be lost. As soon as rethinking is completed, policy proposalshould be quickly implemented.

Above all else, the commercial element of U.S. relations with the EC, which has been at the helm of U.S. policy since the 1970s, should not be permitted to dominate the U.S. agenda with the EC. A balanced aproach that takes into account the political and security implications of the 1992 program for NATO and the transatlantic trade and investment partnership should be implemented.

To achieve this goal, the signals must emanate from the very top of the U.S. leadership lest interagency rivalries and the enormous influence of commercial interests in the making of U.S. policy toward the EC continue to skew a more balanced and effective approach in dealing with the new European Community.

The U.S. Govenment needs much more creativity, savvy, and expertise in order to deal effectively with the EC and its member states. It cannot achieve this when U.S. policy is more reactive than proactive, when behavior and action toward the EC are anachronistic, and when inputs into the decisionmaking process are not coordinated into a framework that takes into account the broader constellation of U.S.-European ties. The EC of the 1990s is an emerging common market with its own foreign policy interests that--along with its commercial interests--often put it at odds with the United States. The more interdependent and noncoercive international system of the 1990s will further encourage the two civilian powers--Japan and the EC--to influence the affairs of other actors. The U.S. must adjust to change in creative ways to pursue the national interest lest opportunities for influence be lost.

Role of Congress

Congress has a critical role in the U.S. policy response to the 1992 program. By holding hearings, members can stay abreast of developments and express their concerns to the Europeans when U.S. interests are threatened. Congress should benefit from hearing testimony of members of the Executive Branch as federal agencies complete internal studies on the 1992 program's impact on U.S. interests and of business representatives as they encounter problems with the 1992 program. As a result, we can alert the Europeans to the extent that the United States Congress is casting a critical eye on the 1992 program as it proceeds. So long as the Congress and Executive Branches approach the 1992 program within the context of the broader set of U.S.-European relations, we can be assured that commercial and security/political interests are pursued in balance. Leadership in reviving a more cogent policy toward the European Community must come from our leaders in Congress and in the Executive Branch if we are to adjust to change before potential gains are transformed into real losses.

The CHAIRMAN. I thank the distinguished gentleman.

Dr. Rallo.

[The biographical sketch of Dr. Rallo follows:]

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EDUCATION

B.A., Lafayette College, 1971, (Russian History).
M.A., Ph.D., Maxwell School, Syracuse University, 1977, 1980, (Comparative Politics: Western Europe; International Relations; Quantitative Analysis).

PROFESSIONAL EMPLOYMENT

1988-	Associate Professor in Political Science, Michigan Technological University.
1985-1988	Associate Professor in Political Science, United States Air Force Academy.
1982-1985	Assistant Professor in Political Science, United States Air Force Academy.
1982-1988	Visiting Professor, School of Business University of Southern Colorado.
1980-1981	Assistant Professor in Political Science, Rutgers University.
1978-1980	University Fellow, Syracuse University.
1976-1978	Graduate Assistant in Political Science, Syracuse University.

DISTINCTIONS

1987-1988	Fulbright (NATO) Senior Research Award.
1986	Clements Award as Outstanding Educator at the United States Air Force Academy.
1984-1985	Grant for Research into European Integration, from the Commission of the European Communities, (one of three political science awards made globally).
1984	Coble Award, for the outstanding national security policy paper at the United States Air Force Academy.
1978-1980	Fellow of the European University Institute, Florence, Italy.

FIELDS OF SPECIALIZATION

Politics of Technology, European Common Market, International Political Economy.

LANGUAGES

French and Italian.

BOOKS, ARTICLES, REVIEWS

The Technological Politics of Alliance Relations, submitted for publication consideration- August 1988.

"Arms Transfers and Italian Security Policy," The Italian Journal (Columbia University), Fall 1988.

"Western Europe," in US-Soviet Foreign Policy: Prospects For Competition and Cooperation; Rogers, Kenneth, ed., Lexington Books, 1989.

Defending Europe in the 1990s: The Divide of High Technology, International Political Economy Series, Frances Pinter (UK) and St. Martin's Press (USA), 1986.

A Proposed European Technological Policy, prepared under grant from the European Communities - 1986, Brussels, Belgium.

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"Great Britain," in Sowing the Serpents Teeth: The Implications of Third World Military Industrialization, James E. Katz, ed., Lexington Books, 1986.

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"Multinational Corporations in the European Community," in Harmonization of European Public Policy, Leon Hurwitz, ed., Greenwood Press, 1984.

review of European Peace Movements and the Atlantic Alliance, Laqueur, Walter and Hunter, Robert, eds., Social Science Quarterly, fall 1986.

review of Multinationals and Political Control, John Robinson, Common Market Law Review, fall 1984.

PAPERS

1980 - Conference of Europeanists, Washington, D.C.
1983 - Colorado/Wyoming Political Science Association
1983 - Colorado Association for International Education
1984 - Western Executive Seminar Center
1984 - Ninth Annual Conference of Europeanists
1984 - University of Limburg, Maastricht, The Netherlands

1984 - International Studies Association
1985 - Colorado/Wyoming Political Science Association
1986 - National Defense University
1986 - Colorado State University Graduate Seminar
1987 - University of Limburg, Maastricht, The Netherlands

ADMINISTRATIVE POSITIONS

1982-1983	Assistant Director, Colorado Association for International Education.
1983-1987	Assistant Director, United States Air Force Academy Assembly (co-sponsored by Columbia University).
1984	Chair, Colorado/Wyoming Political Science Association.
1984	Director, French Student Honors Exchange Program, United States Air Force Academy.
1985-1988	Director, West European Program, United States Air Force Academy.
1986-1988	Director, National Security Symposium.
1987-1988	Director, 30th Air Force Academy Assembly.
1988-	External Doctoral Reader, Graduate School of International Studies (GSIS), University of Denver.
1988-	Michigan Tech Representative to Michigan-Japan University Exchange Initiative.

HOBBIES

running, cross country skiing.

STATEMENT OF JOSEPH C. RALLO, ASSOCIATE PROFESSOR OF POLITICAL SCIENCE, MICHIGAN TECHNOLOGICAL UNIVERSITY, HOUGHTON, MICHIGAN

Dr. RALLO. Thank you, Mr. Chairman.

My name is Joseph C. Rallo. I am the director of international programs and associate professor of science and technology policy at Michigan Technological University, which is Michigan's public university for engineering. Formerly, I was associate professor of national security policy at the United States Air Force Academy, Colorado Springs.

I ask that the lengthy statement I have prepared be accepted into the record and I be allowed to read some summary remarks.

The CHAIRMAN. If there is no objection, so ordered.

Dr. RALLO. The question of Alliance security policy after 1992 has engendered enormous discussion. A recent Economist editorial entitled "NATO versus Euro" notes the following: "Forty this month, the North Atlantic Alliance may be approaching not a midlife crisis but a terminal one. Mr. Gorbachev's promises to cut his forces are one part of its problem. Another is that a more unified EEC, an ideal that many European statesmen now freely aspire to through the 1992 project, may not be reconcilable with NATO."

What then is 1992? 1992 is the final evolution of the European Economic Community to the single internal market visualized initially in 1958. While individual national boundaries will not disappear, the right to make key foreign policy decisions will increasingly transfer to Community officials. The Community is expected to favor regional companies and initiatives as it positions Europe to assume a greater role in global markets.

Two aspects of this evolution separate 1992 from previous, often ineffective, Community initiatives. First is the simultaneous lessening of overall American global dominance as well as a clear willingness on the part of the Soviet Union to shed its image as a military threat to Europe. These changes in the structure of global power relations mean a shift in levers of influence from the military to the commercial sphere.

Second, the Community's managed economy is focused on the exploitation of commercial technology for regional and global markets. As such, the Community will be favorably positioned to exploit these opportunities, especially with respect to Eastern European and Soviet markets. 1992 then is the postwar bid of Europe to emerge as an equal to the superpowers.

What specifically is 1992's challenge to Alliance security policy? The advent of 1992 in the European Community will constitute a direct challenge to the Alliance structure which has been responsible for western security for the past four decades. Although the process of 1992 is coincident to Soviet perestroika, the parallel of evolution forces the Alliance to face changes in basic core values and agreements on which western security policy has rested for four decades.

Three specific challenges will affect Alliance security policy. First, the term "institutional parity," which is, quite simply, the convergence of the previously separate worlds of European defense and commercial policy within the Common Market, which will afford it a foreign policy presence on a par with the United States.

Second is restricted interdependence. The regional focus of 1992 will minimize cooperative commercial ventures with non-Community firms. While the Community will not promote a "fortress Europe" mentality, it will actively favor regional firms. This will be especially true for the defense technology sector.

Finally, the Community will continue to move toward a managed industrial policy mechanism to integrate the region as well as mediate its international role. This will conflict with the market-oriented strategy of the United States, even as both regions move to develop new international arrangements, including those for security policy.

The emergence of the Community will soon require the United States to deal with one institution on the full spectrum of European foreign policy issues. The foreign policy cues of the Community naturally reflect the position of its members. One can suggest that the EC's security orientation will therefore treat the emergence of Eastern Europe, Soviet glasnost, German ostpolitik, and Austrian neutrality in a different fashion than will its American ally.

A significant point of departure will be the use of advanced technology and community foreign policies. The gas pipeline incident in the early 1980's was but a precursor to the problems which will emerge as differences over the nature, extent, and purpose of technology transfers to the East become more visible.

NATO's ability to articulate a credible security posture will suffer from these disagreements in two specific ways. First, there is no longer a shared perception on the extent of the military threat from the Soviet Union. From this perspective, European military assets will be able to credibly offset any Soviet challenge, thereby questioning the need for American participation in Community security matters.

Second, although the West will continue to share many foreign policy values, there will be a distinct break on the means to advance key aspects of that policy. The development of advanced technology for both military and commercial use will be the key ingredient of European and American planning. Differences become visible in anticipation of the role of that technology when dealing with Eastern Europe and the Soviet Union.

Community technology initiatives have, until now, addressed cooperation only for commercial uses. The Esprit coordinates Community, public, and private resources in order to produce commercial technologies capable of capturing major segments of the market. Its success will serve to attract new members to the Community fold. Among the more likely candidates are Austria and, perhaps in the longer term, Hungary. Their participation in Community technology projects will further diminish opportunities for American corporate involvement, and, at the same time, inclusion of these new members makes it more difficult for Community participation in NATO cooperative technology projects. In short, 1992 casts doubt on the interdependence NATO requires in order to fulfill its security mandate.

What should be an American response? The challenge then is for the United States to learn to manage its relations with Europe rather than simply to take Europeans for granted. Shared values, goals, and an equal commercial stature will still create opportunities for cooperation absent in other areas of American foreign policy.

Those Community strengths, though, mean that an increasingly competitive perspective will intrude itself into that relationship. One may suggest some general steps to try and forestall that sense of division while encouraging shared values to again gain the ascendant.

First, encourage the study of Europe and the Community in universities to overcome the perception that Europeans are just like us. As is the case with Canadian-American relations, familiarity can breed ignorance.

Second, investigate the new networks emerging to tie NATO, EC, and corporate technology actors together. Given their colocation in Brussels, this would be the best place to undertake such a preliminary research strategy.

Third, encourage Community firms to remain active in the American market in order to encourage reciprocal treatment for U.S. firms within 1992. This will require American support for free trade measures within the GATT and other liberalization plans, including those measures protecting our own defense technology firms.

Fourth, recognize that NATO's stature is due essentially to its status as the only viable Western organization dealing with a multitude of technology, economic, and defense concerns. As those tasks begin to be assumed by the Community, understand that a leaner NATO does not automatically mean a weaker alliance.

Fifth and finally, acknowledge that Western security rests on the bonds between our peoples and not on specific weapons systems or class of weapons. As the current debate on the Triple Zero suggests, we can too easily lose sight of this simple truth.

I would conclude by suggesting two specific courses of action that I think we should take over the next few years. First, we should initiate inquiries on a new treaty between the Common Market and the United States to carry out the dual mandate of the NATO Harmel agreement, which is to defend and also economics, yet recognizing the new institutional reality that the Common Market presents.

Finally, second, we should consider seriously a centralized, unified American authority to make sense out of competing technology initiatives, commercial and defense, in order to make the American position coherent and competitive in the global arena, which will include the security question.

Thank you.

[The prepared statement of Dr. Rallo follows:]

ALLIANCE SECURITY POLICY AFTER 1992

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the U.S. House of Representatives Committee
on Science, Space and Technology

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The US defense community and European Economic Community (EEC) have never had much to do with each other.
Dov. S. Zakhem, formerly American Deputy Under Secretary of Defense, (December 1988).

The advent of 1992 in the European Community will constitute a direct challenge to the Alliance structure which has been responsible for western security for the past forty years. The presence of an alternative institution with authority to address the spectrum of European security concerns will be the most troublesome aspect of 1992. It is true that Soviet restructuring has created the need for the West to reassess its security goals. But in so doing troubling cracks have appeared challenging security policy goals previously agreed within the Alliance mandate. While the process of 1992 is coincident to this movement, its presence means an alternative to NATO within which to pursue European security policy arrangements. While conventional wisdom might suggest that 'two heads are better than one,' it becomes rather awkward when they are facing in different directions.

The purpose of this essay is to relate the evolution of 1992 to the security tasks still envisaged for the Alliance into the next century. A working hypothesis is that 1992 challenges the traditional Alliance position that commercial competitors can still be security partners because fundamental core values will offset the scramble for global market shares. This essay suggests three phrases as a shorthand means to capture the complexity which 1992 will inject into Alliance security relations:

1. **institutional parity**: the convergence of the previously separate sectors of European defense and commercial policy within the European Community will afford it a foreign policy presence on a par with the United States;
2. **restricted interdependence**: the regional focus of 1992 will minimize cooperative commercial ventures with non-Community firms. While the Community will not promote a 'fortress Europe' mentality, it will actively favor regional firms. This will be especially apparent in the defense technology sector.
3. **patterned complementarity**: the Community will move toward a managed industrial policy mechanism to integrate the region as well as mediate its role internationally. The United States will continue to hew closely to its market oriented strategy. The point of conflict will revolve around the content of new international mechanisms on trade, finance and commerce, given the different approaches taken by the two key global trading groups.

For the United States 1992 is a major challenge. We have long assumed that Western values, traditions and customs would overcome any challenge to the integrity of the trans-Atlantic relationship. The message of 1992 is that we may no longer rest that relationship on an assumption of permanence. We must move to actively engage all parties by recognizing that the ties which bind the west are still stronger than the issues which stand to divide it.

1992: Why is it a threat to NATO?

NATO's forty year history has been shaped by a series of debates over the appropriate limits and objectives of Alliance security policy. NATO's ability to resolve successive sets of often very divisive security issues has been used to demonstrate the vitality of Alliance policy as it responds to change. Two fixed reference points have channeled these debates. First, the presence of a known enemy allowed NATO defense requirements- weapons, tactics, logistics- to be fixed in a rational manner. While debate over specific weapons or tactics was often intense, the threat from the Soviet Union and America's dominant institutional presence meant that solutions were only a matter of time. Second, NATO's unique institutional role, mediating American and European concerns, enabled an Alliance security policy to be articulated notwithstanding often competing perspectives within member governments. These core institutional values were shared by national political-military elites further insulating NATO by casting Alliance security requirements as outside the playing field where domestic allocation decisions were rendered. From this perspective the search for a NATO response to Soviet initiatives and the evolution of 1992 are seen simply as the latest example of Alliance security policy which requires management.

Yet an alternative interpretation exists concerning NATO decisionmaking which is far less sanguine than the traditional perspective. The long lead times associated with weapons production has meant that NATO has always had difficulty in adjusting to change. For NATO planners there is a distinct value in holding relatively constant the nature of tomorrow's threat in order to justify today's decision between alternative weapons. This defense requirement favoring a controlled tempo of change is assisted by the sympathetic posture of NATO officials who must mediate Alliance goals to their home governments, where abrupt reversals from previous recommendations challenge their credibility and standing. Finally, the ability to manage the tempo of change has been reinforced by the fact that NATO, alone among western institutions, is charged with security policy concerns at the multi-lateral level. Clearly, NATO's success stems from the proposition that it is far easier to control the tempo of decisions where opposing views lack a direct point of access into what is essentially a closed decisionmaking circle.

From this alternative perspective NATO's success in resolving 40 years of Alliance debate has been due to its ability to control the need for change rather than to its ability to respond to change. A known enemy and a unique institutional position thus established the boundaries for any security discussions facing the Alliance. The challenge now facing NATO is the abrupt disappearance of those fixed reference points. The change in the intensity of the Soviet military threat mirrored in **glasnost** and **perestroika**, will actually be the easier of the two issues to manage. The 1987 INF Treaty's dramatic destruction of an entire class of weapon cannot serve as a model for follow-on arms reduction measures. A reoriented Soviet Union does not imply a worry free world. Thus arms reductions will be paced, probably according to some 'build-down' formula, allowing upgrades to remaining systems even as others are destroyed. Both parties will realize quickly the need to align arms control decisions with their cycle of weapons procurement and production. A central goal will be to emphasize defense at the expense of offense, in order to structure deterrence in the least provocative fashion possible. The lack of agreement concerning what constitutes offensive or defensive systems is but one of the conditions precedent to longer range change. The complexity of the topic and the conservative attitude of most negotiators will also act to defeat dramatic shifts in position. In short, the East-West arms discussion will play directly to NATO's strength which is to control the pace, scope and vocabulary for change.

It is the disappearance of NATO's unique institutional role, the second reference point, occasioned by the advent of 1992, which will prove far more troublesome. Unlike the controlled, linear change of arms control, 1992 promises a dramatic leap to a new set of conditions for the spectrum of security concerns. NATO's ability to define Alliance security policy has been due largely to its role as the arbiter of West European integrity from Soviet attack. The peculiar irony where global powers such as Britain, France and the Federal Republic remain dependent on an external actor for their protection has engendered commentary from many quarters. This status was the result of a set of unique post-war conditions one of which was the decision for the European Economic Community (EEC), not to assume a direct role in defense matters. As a result, from 1958 onward, NATO served as the single viable institution where European security needs could be debated and defense decisions implemented. That function is eroding for the advent of 1992 means, at a minimum, that regional security matters will finally fall under the policy mantle of a European institution. Simultaneously, 1992 will strain NATO's mediating role as Europe and the United States diverge on the appropriate response to change in Soviet security policy. The foreign policy opportunity created by 1992 therefore challenges the core values which have sustained NATO, as well as provide an alternative institutional partner for the Soviet Union to court. This potential exclusion of the United States from European affairs hinted by 1992 has been seized by Mr. Gorbachev's 'common house' theme. The popularity of Community foreign policy independence is supported by shifts in the political fabric of members as they struggle with their own slate of domestic problems. The opportunity which 1992 presents for a less threatening security stance toward the East is one of the more popular dimensions of this sense of change.

The Challenge of a Community Role in Security Policy

The mystique associated with 1992 is due in large measure to its anticipated impact across a broad swath of key foreign policy concerns. Attention has chiefly been drawn to the avenues for commercial opportunity afforded by the single, regional market. This anticipation correctly notes that several matters of longstanding interest will assume a new immediacy on the Community's foreign policy calendar. The nature of European security policy is certainly one of the items for discussion. Yet, as with other Community topics which were initially too sensitive to be included within the original regional mandate, the path to understand the emergence of a Community security policy is a convoluted one.

The evolution of a Community security policy progressed along a route dotted by several distinct signposts. Not surprising, the initial model for security policy mirrored the 'spill-over' concept then being used to implement Community programs in areas such as agriculture and industry. Of particular note in this process were the trio of Parliamentary reports generated in the mid- 1970s, to pursue a regional security role through creation of a new Community agency. Proposals for a "European Arms Procurement Agency" were designed to merge on a regional basis the defense procurement systems then managed by each national government. Although these recommendations remained still born, the issues they raised refused to disappear and appeared again most recently within the provisions of the 1985 Single European Act on institutional requirements for the single market area.

A second push for a regional security apparatus may be traced to the concerns raised for Community members by their participation within the NATO system. The 1967 adoption by NATO of 'flexible response' as its deterrence policy was based on the decision to emphasize technological superiority and theater nuclear assets to counter Soviet ambition. Reliance on sophisticated technology also kept defense budgets down since, on balance, such systems were less expensive than comparable conventional forces. Technological prowess for defense began to mirror Community industrial policy initiatives which emphasized the commercial exploitation of technology to secure a major share of the global market then emerging in computers, aerospace and data processing. The overlap of technology assets from defense and commercial sectors continued to blur the Community's original mandate not to assume any direct role in security policy. The Community was nudged even further toward assuming a role in security matters because of technology's position in the detente charged atmosphere of the 1970s. Control over technology now emerged as the chief ingredient to attain numerous western foreign policy goals. It became increasingly awkward for the Community to be allowed an active commercial role while still denied a role in defense activities, even as the technology assets for both sectors were themselves converging.

For the United States the turn to technology had been seen as a means to cut the cost of weapons, while sustaining the guarantee to defend Europe from Soviet attack. The SALT I Treaty and the process of MIRVing warheads were consistent with this new role for technology in Alliance security matters. Gradually however this rationale eroded as technological refinements, added to achieve a multiplicity of missions, actually increased the unit price of a weapon. The Navy's decision to build one platform, the F/A-18, to perform two separate missions-fighter and attack- was typical of this movement. This trend was exacerbated by the enormous military build up under the Reagan Administration which stressed exotic and costly technologies. Perhaps the culmination of this search for technology refinement notwithstanding cost was the President's vision to protect America within the Strategic Defense Initiative (SDI). To offset expenses the justification for military programs now began to include the commercial applications of 'spin-off' technology, further eroding the segregation of defense from other sectors of industrial activity.

For the Community the attainment of prominence in technology had become the centerpiece for its commercial initiatives. A multiplicity of proposals in areas such as informatics and computers emerged to varying receptions but hewing closely to two distinct institutional objectives. The first was to position the Community in those industrial sectors which would dominate the global commercial markets of the 1990s. Second, to pursue these goals in a fashion which would protect EC firms against the threat from foreign, essentially American, multinationals. The American willingness to spend large amounts on defense technology with commercial uses directly challenged the Community's ability to attain its goals. Increasingly the pull of the integrating region was unable to offset the financial rewards to European firms from competing for slices of the American defense technology pie, most visibly demonstrated by the contracts offered through the SDI. A Community technology emphasis without a defense component began to act as a drag on resolution of other key foreign policy concerns and could no longer be tolerated. The need for regional action was nurtured by the still persistent inability of Community firms to close the technology gap when compared to the performance of their American and Japanese counterparts. These concerns then allowed the institutional role of 1992 to include a security dimension.

Long time observers of Community behavior caution that a troublesome institutional reality is embedded in the seductive terms of this transformation. From their vantage point 1992 will assume the primary role in the definition of a European security policy because of the Community's ability to dictate the rules for entry into the region's commercial environment. The Commission's power to define the rules of entry has just recently been extended to all "third country imports." Specific tariff charges and exemptions are left to the appropriate Commission staff. Although strictly military items, such as tanks, are currently exempt from these controls their future status will be a decision for Community and not national officials. Shortly one may expect two avenues to be nurtured serving to bring even exclusively military goods under Community authority. First will be measures to address commercial equipment used by the military. While this includes items such as clothing, the emphasis increasingly will center on technologically sophisticated, 'dual use' components and products. Second, there will be a renewed effort to rationalize arms procurement policy among EC members. The initial step was included within the enabling Single European Act to prepare for 1992. Action to control the import of weapons into the region will be justified on a number of fronts including job protection, anti-terrorism and revenue. The outcome will be a "Buy-regional" mandate nurtured by an activist Commission consistent with its philosophy of a managed industrial policy. The opportunity for clashes with a more market oriented America is clear.

The institutional presence of the Community will allow the discussion of Alliance technology matters to take place in a forum whose values are different than the traditional Atlanticist perspective. Observers argue that tensions have beset western security policy since the end of the war and that this current set of problems is merely part of that heritage. While perhaps accurate in an historic sense this observation fails to acknowledge the revolutionary change technology has intruded into the security equation. Technology has broken down the barriers between defense and commercial policy. The term 'dual-use' technology has emerged to illustrate the dilemma posed by, for example, a computer chip whose defense or commercial status is not clear until placed in a product. In this manner the NATO debate over the limits of technology transfers then becomes a useful technique to understand why a separate Community security policy is a direct challenge to the core values of the Alliance.

The Community's desire to exploit technology products in pursuit of European commercial goals, contrasts sharply with the American desire to control their dissemination and transfer on security grounds. The disagreement engendered by these perspectives came to the fore in the gas pipeline controversy in the early 1980s. Particularly troublesome was the Reagan Administration's effort to extend the transfer prohibitions required by domestic security legislation to European partners of American firms. European retaliation was swift, ordering domestic firms to comply with contract provisions even when directly proscribed from so doing by the American actions. After a period of fence mending a tenuous agreement was reached between American and Community officials to avoid a future recurrence essentially by narrowing the list of proscribed technologies covered by the appropriate COCOM list to those with sensitive military applications. All other technology could be freely transferred. Still unsettled though was a standard to determine a technology's "sensitivity" which is currently decided by the owner of a process or the appropriate government regulatory unit.

European firms dependent on American technology for their own processes had been loathe to unilaterally challenge a decision to limit transfers because of security grounds. Thus transfers of even technically ambivalent products have often been limited because of the pressure which American firms and government agencies could bring to bear on their European partners. The chilling effect of American security preoccupations thus served to manage a western commercial regime even when these actions came at the expense of the European partner. The institutional presence of 1992 is now viewed with alarm by these American technology actors because it marks the end of the fragmented European market and, by extension, the end of American dominance in transfer decisions. From this perspective the indifference shown by European governments to American cues during the gas-pipeline controversy was but the precursor to the more formidable foreign policy independence which the post-1992 Community will be able to muster

Alternative Paths To Europe's Security Future

Technology has now emerged to denominate commercial and security futures for European actors, while the core values which previously guided the application of those technologies have evaporated. That erosion leads, in turn, to the realization that the two institutions charged to manage this transition- the Community and NATO- are themselves increasingly at odds on the means and goals to effect change. The reality of this competition is present even in the vocabulary used to define their actions as both NATO and the Community use the term 'interdependence' to identify the shape of their post-1992 security relationship. Each institution also acknowledges that the extraordinary cost of technologically sophisticated weapons negates the ability to 'go it alone' when contemplating particular projects or initiatives. How then can one reconcile the vocabulary of cooperation with what are clear signals from the Community to pursue an alternative path to insure its security needs?

NATO has translated this cooperative desire into a series of initiatives designed to more equitably distribute opportunities for weapons development and production among its members. Some of the more visible of these programs include NATO's Conceptual Military Framework (1984); the Conventional Defense Improvement Proposal (1985); and the Nunn Cooperative Research and Development Initiative (1985). The contract and Memorandum of Understanding (MOUs), let in conjunction with the Strategic Defense Initiative (SDI), have also been pursued as part of this cooperative process. Even the 1989 American Defense Department fiscal plan increases aid for cooperative projects from 3% to 25% of its R and D funding by the year 2000. Such measures are favorably perceived since they are consistent with Thomas Callaghan's call for cooperation in order to forestall the 'structural disarmament' occasioned by the exponential cost of modern weapons.

In contrast to the interdependence envisaged by NATO proposals are the cooperative schemes pursued in conjunction with the Community's anticipated post-1992 security role. From this perspective the watershed cooperative agreement was the IEPG's 1986 report "Towards a Stronger Europe." The Independent European Program Group had long been active in trying to rationalize production and associated R and D assets to create a defense technology infrastructure similar to that existing in the United States. While retaining its independent status the IEPG had repeatedly demonstrated a strong preference for a security policy future denominated in Community terms. Thus it was with little surprise that the report's pivotal recommendation, for a permanent secretariat to guide European security policy, was favorably received within the Community. NATO's initial response was muted with any commentary hewing closely to the traditional view that European integration could serve only to strengthen the Alliance. It was with some dismay then that NATO greeted the series of IEPG/EC defense technology initiatives which appeared at the end of 1988.

Three prominent decisions were recently agreed within the IEPG prompting observers to comment on the emergence of a "Defense Common Market" to complement its commercial cousin. IEPG members agreed to allow national firms to submit procurement bids for arms contracts by eliminating preferences for domestic companies previously sheltered behind 'Buy National' philosophies. Second, France was appointed to head a European Technology Program, similar to the ESPRIT and EUREKA ventures, but directed instead toward military requirements. Finally, a small secretariat, probably no more than nine individuals, is to be established to coordinate this effort from either Lisbon or Rome. The combined effect of these initiatives led one observer to remark that "this is the first concrete step toward the integration of the defense industries in Europe."

When taken in concert with the commercial and institutional movement within 1992 it is clear that while both NATO and EC/IEPG speak in terms of interdependence, the reality is that a regional thrust is emerging to challenge the traditional Alliance mandate. Naturally there are overlaps between these groups and indeed the concept of a European pillar to NATO has long envisaged such a mixture. But contained in 1992 is a threat to this comfortable prescription since Alliance interdependence is no longer synonymous with shared values and goals. It has been that complementary sharing of the means and purpose of security policy which allowed the Alliance to weather past periods of change. To question these values is to challenge the very credibility on which security guarantees rest.

The management of the Alliance's security future may then be phrased in terms of a choice between competing institutional actors. To emphasize NATO over the EC suggests an interdependence which extends beyond the region to include the United States as a partner. To pursue decisions primarily within the Community is to define interdependence in increasingly concentric Euro-centered terms. Security policy is notoriously difficult to assess given the marble cake mixture created by the presence of national, regional as well as Alliance actors and issues. The arcane language of deterrence theory and the intricate quadrille of the defense-technology infrastructure merely add to the murkiness. Thus to assess the tug of 1992 against the core of Alliance values requires more than speculation on the antics or ambitions of one or even several of these defense actors, all of whom are struggling with the reorientations initiated by Mr. Gorbachev's programs.

The convergence of commercial and defense technology programs within the 1992 mandate provides an alternative entry point to assess the course of Community security policy. From a commercial perspective 1992 promises to position Community corporate and public actors to take full advantage of the global technology market. The outpouring of corporate mergers and regional initiatives strongly affirms the depth of support engendered by the promise of the single internal market. The bulk of these industrial transformations are in technologically advanced sectors with important implications for defense. 1992's impact is a long term phenomenon with a European core around which concentric circles of technologically defined actors are, themselves, creating new patterns of relations. Of the numerous patterns becoming visible two particular examples stand out as especially provocative because of their impact on a wide range of security matters.

The R and D funding formula: the ESPRIT/EUREKA models

Community national governments have always directed public support toward companies active in defense production. This assistance has been both passive and active in practice. Passive measures include procurement policies or tariff structures favoring local products often grouped within 'Buy National' legislation. Active assistance includes, by way of comparison, R and D funding and purchase programs tailored in favor of national or preferred actors. As the Economist noted recently, "The Ministry of Défence is British industry's largest customer."

Whatever the exact nature of this governmental activity national policies exist to support three broad needs. First, to ensure the maintenance of a defense technology infrastructure consistent with the security ambitions of a particular country. While France and Belgium share this rationale, their different support levels reflect degrees of adherence to autarky. Second, is the national determination to protect the favorable employment and balance of payments outcome created by a vital technology infrastructure. The explosion of arms exports by Community firms since the mid-1970s is sustained by the financial rewards of the transactions, rather than any sense of arms transfers as part of traditional foreign policy practice. Finally, are the commercial 'spin-offs' derived from defense technology research. It has been estimated that every dollar NASA spent on its early Apollo project resulted in eight dollars for commercial projects. Similar arguments are present in concert with the Community's interest in technology infrastructure support which has tended toward exotic fields such as lasers, particle beams and optical sensors.

The advent of 1992 will overlay regional support measures on these established national patterns in a series of specific ways. First, the increased utilization of regional initiatives, such as the ESPRIT/EUREKA models, will minimize the waste and duplication of scare technology resources created by the presence of competing national projects. The demonstrated commercial success of these programs has served, in turn, to nurture corporate and public support for even more cooperative action. Second, the EC Commission will expand its right to define the conditions under which business may be conducted in the region. This role is especially sensitive for foreign firms which have long lobbied for equal market treatment with respect to their European competitors. The corporate reasoning is that many of their products have a higher Community content than similar products marketed by European firms but assembled in foreign low wage centers. As part of its commitment to the Community market IBM has pressed this position for more than 20 years. In reality though, IBM's dominant position meant that little thought was given to measures whose passage would only open the region even further to foreign competition. The Commission's enhanced mandate within 1992 to establish norms for the percentage of value added required to be termed a Community product is likely to again become a source of debate. Part of that discussion will also respond to mergers through development of rules on the permissible amount of foreign ownership/control needed to qualify for Community status. Finally, the emergence of Brussels as the first true European city will be intensified by the colocation of the EC, NATO and headquarters of most foreign multinationals. The concentric circles of lobbyists, attorneys and interested others will reinforce the regional identity created by the single market. While these trends are significant the long term impact of 1992 on security policy comes from yet another quarter.

1992 strikes at the root of the Alliance technology-security relationship because of its consequences for the prosecution of an independent foreign policy within the Community. The neutral foreign policy preferences of EC members Denmark and Ireland meant that the military orientation of the SDI would preclude the Community from signing MOU's with the

United States as sub-contractors. Instead a regional response to the technology challenge of the SDI emerged in the form of the EUREKA initiative. Initially proposed by French President Mitterrand, EUREKA was publicized as a coordinated European commercial R and D response to the technology opportunities envisaged by SDI projects. EUREKA has since been enormously successful and has become a model for other European public-private technology initiatives. Except for its larger membership and smaller bureaucracy EUREKA mirrors the goals articulated in Community technology projects, most notably ESPRIT and RACE.

EUREKA/ESPRIT as a model for European technology cooperation pose two distinct problems for Alliance security policy. First is EUREKA's emphasis on a reverse 'spin-off' concept to sequence the nature of support for military versus commercial applications. Increasingly regional resources- financial, technological and public- will be directed toward commercial use, with military utilization only as a secondary offshoot. This will make it more difficult to engage in joint agreements with American firms given the latter's desire to attract military contracts and the public R and D dollars earmarked for these projects by the Department of Defense. R and D funding in the United States has been estimated to be $129.2 billion annually, roughly split between the government and private industry. 60% of the government's total will come from the Department of

Defense. The Pentagon's effort to cut costs by buying commercial technology "off the shelf" will further create an entangling relationship with the corporate sector. While the effect on technology transfers is still unsettled, the direct military presence in American technology ventures is at odds with the model developing for Community action.

The second problem posed by the EUREKA/ESPRIT model for European technology cooperation is its relationship to the prosecution of Community foreign policy goals. Application for Community membership requires that two conditions be met: aspirants must have democratic forms of government and must be located within Europe. Questions concerning the accession of Turkey have deflected inquiries on the optimal number of members for the Community. Clearly the Scandinavian countries, as well as Austria, are prime candidates for admission. Community enlargement to include these countries will carry with it a security policy cost at the expense of the Alliance. Each of these potential applicants adheres to a foreign policy which cringes at the suggestion that EC status carries with it de facto NATO membership. A more likely outcome is that their accession will be pursued by phrasing the Community policy on security matters in terms emphasizing the regional content of goals rather than the Alliance agenda. A Community role in the debate on the extent of nuclear weapons required for NATO forces would be a logical extension of this movement. As with other problems this approach does not automatically mandate Community-American disagreement. Its presence though does support the need for Americans to recognize that the institutional role of 1992 means that trans-Atlantic accord may no longer be simply taken for granted.

Corporate mergers and Alliance security policy

The second topic to investigate the changes which 1992 suggests for Alliance security policy management involves the current wave of corporate mergers. The advent of the Community in 1958 set off a succession of mergers as foreign, essentially American, firms sought to position themselves to take advantage of the new market. Since then three distinct cycles of accommodation to foreign competition have occupied the attention of Europeans at corporate and Community levels. Each wave of activity has served as a learning experience which together form the outlines for Community actions in the post-1992 environment.

The first burst of corporate activity clustered around the Community's initial founding in 1958. It was clear to American firms that the levies promised by the common external tariff (CET) could impede their prosecution of business opportunities within Europe. To avoid these problems American firms began to establish European subsidiaries leading in 1967 to Servan-Schreiber's dismay over the "American Challenge." European firms were slow to emerge from their pre-war mentality of sheltered markets along national lines. Their inability to initially adapt to regional opportunities was little aided by a European Commission struggling to define its own mandate, let alone deal with the proliferation of commercial issues created by the Rome Treaty. American firms often bought out smaller European companies to assist their transition into this new market. Europe also relied heavily on American companies and the government to meet their military requirements.

The second merger wave was clearly visible by the mid-1970s. Europe's immediate post war rebuilding needs had been achieved successfully. By the late 1960s several of the Community's members had undergone economic rebirth leading to financial, commercial and export assets often on a par with American firms. The Community integration process assisted this regional focus announcing, as it did at the 1972 Paris Summit, "political union by 1980." Thus as detente assumed the leading role in East-West relations the Community was well underway toward meeting its two major challenges- market integration and foreign competition. Three particular aspects of this Community activity had long term implications for the defense technology sector. First was the effort by European governments, especially that of France, to merge its separate defense companies into a single more competitive structure. Raymond Vernon coined the term "national champions" to explain this process. Second, was the parallel introduction of action plans to merge national capability in selected advanced technology fields under Commission direction. The 1975 *Informatics Plan* and the 1976 *Aerospace Initiative* were the most visible of these projects. Both plans sought to remove these technology sectors from national control, merge them under Community direction and use this new structure as the instrument to project regional commercial goals to the global arena. Finally, was the continued division between commercial and defense technology firms and projects. By this time France and Britain were beginning to derive substantial revenue from exports of sophisticated weapons systems. To insure this activity and also for considerations of broader national security goals, no overlap between initiatives in complementary, technologically dependent projects was allowed. Perhaps the best example was the complete separation between the two primary regional aerospace programs of the time- the military Tornado and the commercial Airbus. This unwillingness to bridge the fragmentation of effort created by national rather than regional direction also nurtured the technology gap with respect to American and Japanese multinational firms.

The third phase of Community mergers responded to previous failures through adoption of a unique regional formula for cooperation. By the early 1980s national governments had acknowledged an inability to promote programs with sufficient appeal to overcome the obstacles of the still fragmented regional market. The Commission realized that its niche was to erect a market structure to encourage regional cooperation, rather than to seek that goal through legislative fiat. This coincidence of views was supported by the movement toward 1992 entertained by the passage of the Single European Act (SEA) in 1985. Although the SEA paved a number of program avenues its primary contribution was to reintroduce the concept of majority voting for all but the most sensitive of Community decisions. In one stroke the Commission was able to assume the role of mediator between competing national regulations, while directling the package of reforms toward the coherent single market envisaged for 1992. The new burst of cooperative activity in this third stage was a direct result of the removal of this institutional logjam.

The most visible outcome of this cooperative activity has been to introduce Community-national initiatives in key technology sectors. The success of ESPRIT, RACE and other similar initiatives strongly suggests they will assume an even greater importance when the final market barriers are dropped by the process of 1992. The natural extension of this formula to the defense technology sector also carries with it an unanticipated benefit for the Community.

Community members may be grouped into three distinct levels of technology actors. France, the Federal Republic and Britain all rest on top of strong dynamic technology infrastructures with long records of success in commercial and defense activities. Any regional mergers or cooperative ventures will require their active participation ensuring favorable terms for their inclusion. At the other end of the spectrum are those Community members with limited technology capabilities and few pretensions on their ability to challenge either European or foreign firms for market shares. By and large they support regional technology initiatives as providing financial, employment and market opportunities they could not attain on their own. Caught in the middle are those members whose technology status has been moving toward that of the top level because of their collaborative arrangements with foreign, essentially American firms. Here we find Italy whose emergence into technology prominence has been due to its ability to gain access to American technology, modify it to European market needs and realize a profit primarily from the ability to skip over the costly R and D phase of production. The Italian weapons sector is particularly dependent on this American connection and has voiced concern over the tariff which 1992 will impose on all foreign imports. The unanticipated benefit to the Community created by the ESPRIT formula is two-fold. First it provides a mechanism to equitably distribute resources, rather than allow weaker Italian firms to have terms dictated to them by stronger regional actors. Second it will be far easier to wean Italian firms from their American technology partners if the Commission is able to mediate between Italian and other regional actors. A few years ago Italy would probably have turned to McDonnell Douglass for the 'jump-jets' it plans to build for its aircraft carrier, the *Garibaldi*. It is now more likely that Italy will seek to partner with British Aerospace for its equivalent Sea Harriers. Each of these three merger phases then paved the way for regional action in the post-1992 market area.

Merger activity in anticipation of 1992 builds on the lessons of the previous three cycles. The management formula of ESPRIT/EUREKA has allowed coherent programs to emerge blending Community and national actors and assets. Now regional initiatives are being matched by cross border mergers. The role of technology as both a product of and a facilitator for commerce has insured that technologically active firms are well represented in this cycle. What is unique about the nature of current activity is the direct inclusion of national defense firms. The recent partnership of the defense technology components of Matra (FR), Daimler-Benz (FRG) and General Electric (UK) is typical of this activity. The Community's role in this 1992 merger conditioned activity is two-fold. First the Community serves as a partner within selected technology initiatives such as ESPRIT. Second the Commission acts to create an internal market structure designed to facilitate the progress of European corporate cooperation. It is this latter role which poses the more far reaching impact of 1992 on Alliance security concerns.

There are two distinct examples of defense technology related mergers with differing implications for Alliance security policy. First are what might be termed "project mergers" where firms form teams to pool assets to compete for a specific weapons contract. American and European firms are finding this type of relationship to be in their mutual interest. These transactions essentially are designed to accept the contract opportunities held out by those previously identified cooperative programs being pursued by NATO. Given NATO's increased emphasis on joint projects, teams composed of several national actors are favorably situated. These contracts include longterm projects such as the NATO frigate program and the anti-air warfare system (AAWS) for point defense of surface ships. Project mergers can be lucrative examples of multinational cooperation, but fall far short of superimposing an Alliance perspective on the emerging regional bias of 1992.

The second type of merger we are witnessing involves only European defense technology firms. These actions may be seen as "structural mergers" because their full impact can only be appreciated as part of the entire spectrum of market changes hinted by 1992. The previous section discussed the introduction of a unique European foreign policy occasioned by the institutional role promised by 1992. To these changes must be added those in the financial, capital and monetary sectors of Community activity. Structural mergers then become one of the intricate program strands which give 1992 meaning. When added to the traditional close relationship enjoyed between European public and private actors one can begin to understand why 1992's market potential may be defined in terms of an industrial policy on a par with that most successful of models, Japan's MITI. Indeed it is quite likely that the Community's new found ability to integrate commercial and defense technology sectors will give it global advantage, even over its Japanese competition. NATO membership allows these restricted Community consortia to bid on Alliance projects, while not carrying any sense of reciprocity for regional initiatives. Clearly then one must seek a balance between Community aspirations and legitimate Alliance requirements.

Closing Thoughts

There is no simple solution for the Alliance as its security policy is questioned by events in Europe and the Soviet Union. It might even be deemed unfair to call for action when these events are themselves unclear in either content or form. The removal of Mr. Gorbachev, British stubbornness or a host of other problems could easily derail perestroika, glasnost or even 1992. Even if it were possible to play for time in the area of security policy, it is equally clear that commercial matters are less easily forestalled. The heightened awareness of change introduced by instantaneous communication has not made these processes any easier to control. Indeed it is Mr. Gorbachev's use of the western media which insures that the Alliance needs to act before it is swept before a tide of public opinion. Several examples spring to mind in this regard but none with the immediacy of the current controversy over the issue of nuclear weapons in Europe.

Flexible response, including recourse to nuclear weapons, has been NATO doctrine since 1967. A number of reasons support this doctrine but none more important than the need to deter a hostile Soviet Union. The Alliance is currently faced with a public relations nightmare where the Chancellor of the Federal Republic and his putative adversary, Mr. Gorbachev, pursue a nuclear-free Europe over the opposition of the American President. Naturally a number of motivations impose themselves on the deliberations of the parties; but it remains that one side is able to portray its position in more publically appealing terms than the other. It does not take an incredibly subtle observer to note the effect of these squabbles on Alliance security guarantees.

The European Community occasioned by 1992 raises a series of questions only some of which are directly related to these debates on Alliance security policy. 1992 is one means to adapt and direct change according to regional goals. That adaptive action does not occur in a vacuum, free from interaction with the external environment. Indeed much of what the Community has accomplished over the past decades has been as a response to the challenges directed at it by others. Although the core issue of Community activity has concerned the management of sovereignty and not security, the nexus between these terms is among the most difficult to untangle. As such, 1992 draws its institutional vitality from the opportunity to rejoin the rended sovereignty which resulted from the termination of World War Two.

The challenge that 1992 offers to the Alliance is the recognition that the divisions created by the war's settlement are themselves being reworked in a fashion more in keeping with the equity now apparent between the Community and the United States. That equity will gradually evolve to include military as well as commercial, monetary and economic assets. The United States must learn to approach the Community as a partner and not as a supplicant. The institutional focal point anticipated after 1992 will make Euro-American relations easier to manage, once both sides move beyond the reorientation occasioned by the increased parity in their comparative stature. If we remember that 1992 is a learning experience for European and American alike, it will be easier to cope with change. Ultimately it is flexibility which sets the Alliance apart and which, notwithstanding problems, ultimately binds it together.

The **Chairman**. Thank you very much, Dr. Rallo.

Dr. Sullivan.

[The biographical sketch of Ms. Sullivan follows:]

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Advisor, NGO Forum at the United Nations on the Future U.N. Role in Disarmament and Crisis Monitoring

PROFESSIONAL MEMBERSHIPS

American Society of International Law. Member, Space Law Interest Group

American Astronautical Society

American Institute of Aeronautics and Astronautics

International Institute of Space Law

International Law Association. Member, Air and Space Law Committee

International Studies Association. Member, International Law Section; International Organization Section; International Security Studies Section; and Governing Board, Northeast Section

PROFESSIONAL CONFERENCES AND PAPERS

Future

European Community Studies Association, First Annual Meeting. Washington, D.C. May 1988

- Chairing a Panel on "European in Space: Technology for the 1990s and Beyond"

Recent

NGO Forum at the United Nations, May 10-12, 1989

- Speaker on Multilateral Satellite Monitoring: Prospects and Problems

Association of American Law Schools Annual Conference. New Orleans, Louisiana. January 6, 1989

- Member of Panel on A Space Policy for the New Administration

American Political Science Association Annual Meeting. Washington, D.C. August 31-September 2, 1988

- Gave a Paper on "Territorial Claims in Outer Space: Prospects and Problems"

Conference on Our Common Future: A Call for Global Action. Ottawa, Canada. June 17-20, 1988

- Speaker on "The International Satellite Monitoring Agency"

Luncheon Meeting of Governmental and Arms Control Officials and Non-Governmental Representatives. Ottawa, Canada. June 21, 1988

- Featured Luncheon Speaker

American Institute of Aeronautics and Astronautics, Greater Philadelphia Section. Annual Membership Meeting. June 9, 1988

- Speaker on U.S. Space Policy

International Studies Association Annual Convention. St. Louis, Missouri. March 30-April 2, 1988

- Organizer and Member, Roundtable on "Legal Rules Needed to Assure Peaceful Uses of Outer Space"
- Organizer and Chair, Panel on "The Future of the Individual in International Law"

Delaware Valley Women's Conference. Philadelphia, PA. April 9, 1988

- Member, Panel on "World Law and International Organization as a Means of Preventing War and Preserving the Environment"

Carnegie Endowment for International Peace. Meeting of the Group of Advisors of the Commercial Observation Satellite Project. March 10, 1988.

- Wrote a Paper as background for the Project and made a presentation based on the Paper

Seminar on "Open Skies and Observation Satellites: An Opportunity for U.S. Leadership?". November 4, 1987. Co-sponsored, organized and made Opening Remarks.

Section on Military Studies of the International Studies Association. Atlanta, GA. September 24-26, 1987. Held in conjunction with the First Secretaries of Defense Meeting.

- Gave a Paper on "The New Open Skies: Positive Military Applications for Reconnaissance Satellites and Their Data"

International Conference on the Relationship Between Disarmament and Development. United Nations, New York. August 24-September 11, 1987

- Presented a Statement on "Connecting Space and Earth: Using Available Technology to Achieve Disarmament and Development"

International Studies Association Annual Convention. Washington, D.C. March 1987

- Organized and Chaired a Panel on "Legal Issues in the Use of International Areas"

PUBLICATIONS

In Progress or Finished But Has Not Yet Appeared In Print

Books: Outer Space: An Introductory Guide for Reference and Research.
Publisher: ABC/Clio. Publication Date: 1989

A Management Regime for Outer Space

Chapters for edited book: "Using Space Systems to Build Space Age Security" and "ISMA: A Review" in Satellite Diplomacy
Publication Date: 1989

Articles: "Observation Satellites: Making the Earth Visible" for Political Woman

"A Space Regime for the 1990s and Beyond" for World Policy Journal

"Observation Satellites and Intelligence for the 1990's" for Intelligence and Counterintelligence Journal

"Open Skies" for Space Policy

Policy Paper: "An International Satellite Monitoring System"

Book Reviews: L'arme nucleaire en droit international for American Journal of International Law

Published

Articles: "Making Choices in Space" in Breakthrough, Fall 1988

"Connecting Space and Earth" in Toward Freedom, December 1987

"The Cosmological Eye: The Proposal to Establish an International Satellite Monitoring Agency (ISMA)" in Transnational Perspectives, November 1985

Bibliography: "Remote Sensing Bibliography", 1987

Monograph: "An Idea Whose Time Has Come: The International Satellite Monitoring Agency", 1985

"A Draft Plan for the Management of Outer Space", Spring 1988

Reports: "Report on the Seminar on Open Skies and Observation Satellites: An Opportunity for U.S. Leadership?", December 1987

"Report on the Seminar on Observation Satellites, The George Washington University, November 4, 1987" and "Report on the Colloquium on The Common Heritage Concept: Past, Present and Future", Villanova University, December 11-12, 1987" in the Journal of Space Law, 1988

"Report of the Conference of UN Organizations Working Group for the UNA-USA Study on Outer Space", 1986

Book Reviews: "The Mars Project" in American Journal of International Law, 1987

"Space Law Teaching Around the World" in American Journal of International Law, 1988

"World Order Teaching" in International Organization, 1986

RELATED ACTIVITIES

Researcher, Writer, Lecturer and Policy Analyst in:
- Space Law and Policy
- The Arms Race and Arms Control: Problems and Alternative Solutions
- International Organization and International Law

Non-Governmental Representative to the United Nations

Consultant to private organizations

Organized:
- Seminar on "Onward and Upward: Reasserting U.S. Leadership in Space. A Discussion of the new American Space Policy"
- Colloquium on "The Common Heritage Concept: Past, Present and Future"
- Conferences on "Peace, Justice and the United Nations"; "Youth and World Order" and "International Bicentennial Symposium"
- Seminars on Outer Space; Arms Control and Nuclear Policy; Law of the Sea; and Antarctica. Washington, D.C., New York and Philadelphia
- Receptions for United Nations Diplomats. New York
- Conference on Designing a World Space Organization. Mohonk, New York

STATEMENT OF COLLEEN DRISCOLL SULLIVAN, DIRECTOR, SPACE AGE LAW AND POLICY INSTITUTE, AND FACULTY MEMBER, DEPARTMENT OF POLITICAL SCIENCE, VILLANOVA UNIVERSITY, PHILADELPHIA, PENNSYLVANIA

Ms. SULLIVAN. Thank you, Mr. Chairman.

I am Colleen Sullivan. I am from Villanova University, Department of Political Science, and I am also director of a small research institute called the Space Age Law and Policy Institute, which is in Philadelphia.

What I am going to do is discuss Europe in space. I have presented a paper for the record. I am simply going to go through it and summarize some of the points and a few of the facts.

The CHAIRMAN. If there is no objection, your statement will appear in full in the record.

Ms. SULLIVAN. Thank you.

First what I want to do is note that the European Space Agency, or ESA, is not synonymous with the European Community. There are a few differences as far as the membership. However, the ESA and the European Community do work together very closely and are in the process of putting together some projects in space technology and space science in which they will be working even more closely over the future time.

Evidence of the importance of space in the scientific and technological planning of Europe can be found in many of the European documents, including many of the documents of the Parliamentary Assembly of the Council of Europe, and just to make a short quote from one of the documents of the Parliamentary Assembly, they say such things as believing that the potential for European achievement in the space field will never approach that of the United States and the Soviet Union unless the funding which their space programs receive for military purposes is matched in Europe by commensurate additional expenditure on national European and ESA-sponsored programs. They also go on to state very much the importance the space projects to Europe and to their planning.

There was a meeting of ESA in the Hague in November of 1987 in which they agreed on three programs in space on which they were going to concentrate up into the next century, and at that point what they did was talk about Europe achieving full autonomy in space, and there was some question on the part of the British whether full autonomy of space was really what they saw Europe as heading for.

The three projects are the Hermes project, which is a space plane; the Ariane 5, which is the next generation of the Ariane rocket; and the Columbus, which is a collection of components which will go on NASA's international space station and which the Europeans at this point in 1987 decided that that would be the beginning of their own space station, that they would be heading toward this full autonomy in space.

What they started to get into at that point was the question of manned space flight, and the French industry minister said, "Europe has picked up the challenge of manned space flight," and the discussion that went on at that point was that Europe no longer wanted to simply be adjuncts to U.S. or Soviet flights, no longer were their astronauts simply able to sort of tie into other flights, but that they were going to be able to have their own access to space and their own station, and they discussed the fact of a partnership with the United States. And one of the problems that occurred on the part of the United States that brought this whole thing to a head was the fact that there was a question that came up whether the Department of Defense was going to keep its options open to put some of its military payloads and some testing on the space station, which the Europeans, of course, see as an international space station. I have, in fact, heard Europeans, NASA people, Japanese, and Canadians all discussing the point of an international space station and exactly what it means.

In July of 1988, the European Community released some plans for moving Europe into the position of a world space power. The plans involve both the European Community and ESA working together, and the European Community Commission stated its intention to support ESA programs by developing satellite technology, improving the analysis of data, conducting research, and, in every way that they could, helping ESA in its work.

There are a number of programs in Europe right now for research and technology, including the Esprit program and the Eureka program. In all of these, there is a space component, and it is tied into the development in all these various programs.

I have put in my paper a number of successes that Europe has had in the space area, and one must remember that Europe joined the space age very early. In the very early sixties, they began having U.S. rockets put their satellites up into space, and space became an important part of their planning from the very beginning.

I will not at this point go into any of these, except to note the one that you probably are particularly aware of, which is Spacelab, which is very successful, on the space shuttle, and was mainly worked on by West Germany.

The biggest problem right now that Europe is facing in space is really a financial problem, the same thing the United States is going through, and there is some reassessment that is going on in Europe now as to how much of a contribution the European states are going to make as national members of ESA and of the EC to the space programs, and there are—I should note that in ESA there are two sets of programs. There are core programs, and all the member states are assessed their contribution to that, and there are also some optional programs to which they give money according to their desires mainly and also according to the number of contracts that their space industries will have in that particular project.

The British have been particularly critical of the costs of the new programs that Europe is talking about getting into and have been very critical of the Hermes and of the new Ariane 5 rocket, saying that it is a heavier rocket than Europe really needs and that Europe is getting into an area which is already covered by the U.S. and Soviet Union and duplicating work that does not need to be done.

They are also undergoing a manned versus unmanned argument in the same way that we sort of are here also as to whether manned space flight is really worth the expense. And although the French Academy of Sciences stated that man in space is not particularly useful, they then came down to the point that is made also in the United States that it appears legitimate that France and Europe want to take part in a human adventure that acts as a powerful theme of international cooperation and to play a full role in the interplanetary flights of the next century. And they also discuss the fact that if you are going to get public opinion involved in space, then you need to have manned space flight, because the public does not understand or does not get involved in the scientific aspects of it.

Again, however, the British have been in opposition to much of this, stating that they are not exactly against man in space but they are against the idea that Europe should achieve autonomy in space by the year 2000.

At this point, one must remember that there is an increasing cooperative relationship between Europe and the Soviet Union as far as space activities, and part of the reason is, the Soviet Union is willing to transfer its technology to a larger extent than the United States is.

There is always a problem when we get into the question of technology transfer, and many times what the United States does is lose some opportunities for international cooperation because we do not want to transfer technology. And this has to do with much of the technology for the future, and we are not quite sure, and we do not have a consistent policy on how we are going to do this, and it is necessary because the Europeans do get very frustrated when we are not quite sure where our policy is going.

The Single European Act gives the European Community some specific powers in the area of science and technology which they didn't have before. It does involve ESA and the European Community to a much larger extent than it had before. It has come up with a framework program of research and technology for the period of 1987 through 1991, and it covers some specific fields, and space is very much a part of this whole thing.

The idea that there is a "fortress Europe" coming is not really true. What the Europeans are looking for is national treatment, reciprocal treatment, the fairness that comes with the sharing of technology and the sharing of knowledge in the space field as well as in the other science and technological fields. And they need the United States, and the United States needs Europe, and therefore the question really to be looked at is how we are going to cooperate in the future. Keeping in mind the fact that what Europe really has in mind with its new development of its space program is the fact that it does want to be a full partner with the United States. It does not want to be a poor stepson or whatever position it is that they feel they have been in before. For the United States, there are other implications.

The Europeans join together in the European Community, in a sense, copying what the United States did when we first set up our country in the 1700's. And now, if we turn it around and we look at what they are doing, we can see that we have a new chance to restructure and to reorganize our joint and our individual, our public sectors, our industry, our financial institutions, into a new way of looking at the United States in space. And we have to remember, the United States must keep competitive not just with Europe but with the whole Pacific Basin area also.

I think the question that I really want to come down to, or maybe the answer, or the suggestion that I really want to come down to, is the fact of U.S. leadership in space and what it is that we are doing with our own space program. And the real answer is that the United States needs to have a more consistent space program of its own to decide where it is that we are going with such things as Landsat rather than getting it to the point where it is in danger of being turned out and we are in danger of having no earth resources satellites in space.

Also, our decisions as to the space shuttle and the expendable rockets, deciding exactly where it is we are going, and what the space shuttle is, and what it is in its future, and which of the missions are more important to put on it, so that such scientific missions as the space Hubble telescope are not going to be put off and off year after year. And then we should look at some of the things we have done before in space and see that we have not really built upon our previous knowledge, such as the Apollo program. And the real need is that the United States needs to get its own act in order in space; to look at ourselves and decide what our goals are as a nation in space, to do the long-term planning that it takes if you are really going to be involved in space, and to do the long-term financial planning that it takes; and then to go out into the public and to educate them as to what space really means, what the possibilities are, and what it means for the United States.

In this way, we can work with Europe in 1992 and beyond and feel that they will feel they are full partners and we will have the kind of cooperation and sharing of expenses, which is very cost-effective in space, and sharing of technology that is of advantage to us also.

Thank you.

[The prepared statement of Ms. Sullivan follows:]

Testimony of

Colleen Driscoll Sullivan
Department of Political Science
Villanova University

and Director,
Space Age Law and Policy Institute

before the

U.S. House of Representatives
Committee on Science, Space, and Technology

May 16, 1989

> "The Community shall have as its task, by establishing a common market and progressively approximating the economic policies of Member States, to promote throughout the Community a harmonious development of economic activities, a continuous and balanced expansion, an increase in stability, an accelerated raising of the standard of living and closer relations between the States belonging to it."
>
> \- Treaty of Rome, 1957

Europe in Space

The major efforts of Europe in space exploration take place within the cooperative programs of the European Space Agency (ESA). The member states of ESA decide together on the core programs on which the Agency will concentrate. They contribute financially to the carrying out of these projects according to an agreed-upon formula based on their individual gross national products. This formula applies to the mandatory scientific and technological programs which are the basic work of ESA. In addition, there are optional programs in which the Member States can choose to participate or not. In regard to these programs, the States decide for themselves the amount of the expenses which they are willing to pay, often dependent on the proportion of the contracts obtained by their own aerospace companies.

ESA was founded in 1975 as a merger of the European Launcher Development Organization and the European Space Research Organization. Its member states are: Austria, Belgium, Denmark, The Federal Republic of Germany, France, Ireland, Italy, The Netherlands, Norway, Spain, Sweden, Switzerland, and The United Kingdom. Of these countries, Austria, Norway, Sweden, and Switzerland are not members of the European Community. [Greece, Luxembourg, and Portugal are members of the EC, but not of ESA.]

According to the Convention for the Establishment of a European Space Agency:

> "The purpose of the Agency shall be to provide for and to promote, for exclusively peaceful purposes, cooperation among European States in space research and technology and their space applications, with a view to their being used for scientific purposes and for operational space applications:
>
> a. by elaborating and implementing a long-term European space policy, by recommending space objectives to the Member States, and by concerting the policies of the Member States with respect to other national and international organisations and

> institutions;
>
> b. by elaborating and implementing activities and programmes in the space field;
>
> c. by coordinating the European space programme and national programmes, and by integrating the latter progressively and as completely as possible into the European space programme, in particular as regards the development of applications satellites;
>
> d. by elaborating and implementing the industrial policy appropriate to its programme and by recommending a coherent industrial policy to the Member States."

Evidence of the importance of space in the scientific and technological planning of Europe can be found in many European documents. To quote one such document, which shows the importance which Europe gives to space research as well as some of the reasons why, Resolution 788 (1983) of the Parliamentary Assembly of the Council of Europe:

> "The Assembly,
> 1. Considering the consistent interest that it has shown, as reflected in Recommendations 844(1978) and 896(1980), in the development of a substantial and distinct European space capability...
>
> 6. Believing that the potential for European achievement in the space field will never approach that of the United States and Soviet Union unless the funding which their space programmes receive for military purposes is matched, in Europe, by commensurate additional expenditure on national European and on ESA-sponsored programmes...
>
> 7. Recognising the stimulative effect upon the depressed economies of Western Europe of creating additional highly skilled employment and of developing many new technologies and processes as well as a wealth of commercial applications, which makes space activities a very appropriate area for governmental financial support in Europe...
>
> 12. Perceiving the importance of developing a long-term European space strategy, for which considerable forward financial planning and budgetary provision are essential on the part of governments, necessitating a more regular and committed involvement by Ministers in the higher direction of the European Space Agency...

> 13. Confirming that no great endeavour is sustainable unless it engages the will, the mind and, above all, the spirit of mankind; that the exploration and utilisation of space constitutes for the remainder of this century and beyond an inspiring challenge and historic opportunity; and that the realisation for Europeans of the full scientific, technological and commercial potential of space demands political leadership of the highest order if the necessary human and financial resources are to be mobilised...
>
> 14. Calls on the governments of the member states of the Council of Europe:
>
> a. to agree that an expanded and distinct European space programme constitutes a common technological, political and industrial objective of the highest importance for which adequate economic resources must be allocated on a long-term basis..."

At a meeting of the thirteen member states of the European Space Agency (ESA), held in The Hague in November 1987, three programs were agreed upon for European emphasis into the next century. This was considered a victory for France, which has been the originator of many of the major ESA programs, and which has a vigorous space program of its own. It was the first step in what was referred to as "full autonomy in space" for Europe by the end of the 20th century. The three programs are: Hermes, Ariane 5, and Columbus.

Hermes. A spaceplane capable of carrying a crew of three, Hermes is envisioned as providing astronauts with mobility in space, ferrying them to and from space-based facilities. It is also intended as a ferry for carrying scientific experiments back and forth to space stations and platforms. It will glide to Earth in a landing similar to that of the U.S. space shuttle.

The Hermes project was initiated by the French space agency, the National Center for Space Studies (CNES) but became a European project in October 1986, with CNES managing the program. It is to be launched on Ariane 5, which itself will not be fully operational until 1998. Hermes will orbit at 500 kilometers and have a payload capacity of 4.5 tons.

Ariane 5. The new generation of Ariane rockets is scheduled for its test launching in 1995 is expected to be in full service by 1998. It will be a heavy-weight rocket able to launch a payload of 8,000 kilograms. It has been planned so that it can carry Hermes, large satellites, and components of a future European space station or other space platforms into space. Ariane 4, first launched on June 15, 1988, has a payload capacity of 4200 kilograms, considerably more than the Ariane 1 rocket, which was launched in 1979. There are six versions of the Ariane 4, together with a multiple launch system, allowing the launch vehicle to be tailored to the requirements of the payload.

Columbus. A collection of components, including a space laboratory, Columbus will be attached to the NASA International Space Station. It also contains a man-tended free flyer (MTFF) which is envisioned as the core of a future European space station. The MTFF is a self-contained laboratory which will be used for experiments and will be serviced by Hermes. It also contains a polar platform which will carry Earth observation equipment. The progress of the cooperation which is part of the NASA space station will determine to a large degree the direction of future cooperation in space.

Hermes and Columbus are both projected to cost $5.3 billion over the next decade, with Ariane 5 expected to cost $4.2 billion. This would require a doubling of Europe's space budget over the next ten to twelve years. [The 1986 ESA budget was $1.79 billion.]

Two of the three programs involve manned space flight, a new direction for the European space effort. Following the decision to concentrate in these three areas, French Industry Minister Alain Madelin said: "Europe has picked up the challenge of manned space flight." European astronauts can look forward to one day being able to fly on European flights and perhaps live in a European space station, rather than being adjuncts to U.S. or Soviet flights and programs. Europe sees its development of a manned capability as strengthening its role in future partnership efforts with the United States -- a partnership which was jeopardized when the Defense Department tried to put restrictions on European access to the International Space Station so that they could keep open their options for including military payloads and testing in the Station's mission.

In July 1988 the European Community released plans for moving Europe into the position of a world space power. These plans involved research programs and an even closer connection between the EC and ESA. They particularly mentioned telecommunications, aeronautics, and robotics as areas of EC-ESA cooperation. The EC Commission stated its intention to support ESA programs by developing satellite technology, improving analysis of satellite data, and conducting research in fields such as micro-gravity. It also stated its intention to plan its industrial policy with the needs of space technology in mind, and to increase the training of specialists in space-related areas.

The EC Commission is working on specific proposals to carry out these plans. However, no new financing is expected to be made available until the current EC research program ends in 1991.

The EC's European Strategic Programme for Research and Development in Information Technology (Esprit) is the program through which the EC has been planning for a European Technology Community. It was set in motion after meetings between the Community and industry in 1982. Its official beginning was February 28, 1984, with a ten-year program of action. Space-applicable technologies are part of the program, especially satellite technology.

Europe is also working through the European Research Coordination Agency (EUREKA) to sustain Europe's competitive international position in advanced technology. Some of the European aerospace industries are involved in this effort.

There have been many impressive successes in the space programs of the European Space Agency and of the individual spacefaring states of Europe. It must be remembered that Europe joined the space age early. The United Kingdom's first scientific satellite was launched in 1962 and Italy's in 1964, both on U.S. launch vehicles. They were followed by France, The Federal Republic of Germany, The Netherlands, Spain, and Sweden. The first joint European scientific satellite, Heos, was launched in 1965. Europe has had a number of very successful satellite programs, involving telecommunications, meteorological, remote sensing, scientific, and direct broadcasting satellites.

The Ariane rocket has proven to be a reliable, regular method of launching payloads from low Earth orbit to geostationary orbit. As must be expected with technology, there have been some failures, but ESA is working to improve its reliability. As of 1988, its success rate was 81%. ESA has proven to its customers that the Ariane is a dependable launch system and it has been rewarded with an increasing share of the commercial launch market, particularly since the accident of the U.S. Space Shuttle Challenger.

Ariane is now feeling the competition from the growing U.S. launcher sevices, but Arianespace is actively searching out new customers for its services, including INTELSAT, the International Telecommunications Satellite Organization, and NATO. The company has ordered 50 new Ariane 4 rockets, to be delivered by 1991. Arienspace is a 60% French owned company, 34% by CNES and 66% by European aerospace and electronic companies.

The Giotto scientific satellite had an encounter with Comet Halley in 1986 and acquired the first close-up photographs of the center of a Comet. It will observe Comet Grigg-Skjellerup in 1992. The Meteosat program launched satellites in 1977 (no longer operational), in 1981, and in 1988. Two more are planned before the program ends in 1995. This is a joint project of ESA and EUMETSAT, the European Meteorological Satellite Organization.

ERS-1, the European Earth Resources Satellite due to be launched in 1990, will make Europe a competitor in the commercial remote sensing market. It will have a resolution equal to that of the Landsat satellites now in operation and will be used to observe coastal zones, ice and land areas, and sea surface. ERS-1 data will be precessed and distributed to users through the Earthnet System.

Olympus, the first of a powerful new class of communications satellites, will be launched next month. It will open up new possibilities for direct broadcast of television and for long distance communications

March 1986 was the beginning of ESA's five-year Earth Observation Preparatory Programme (EOPP). Its purpose is to plan Europe's Earth observation activities up to the end of this century. It includes a second generation of Meteosats, a number of Earth observation programs, and Aristoteles, a low Earth orbit spacecraft which will observe and measure the Earth's gravity field.

Spacelab. The first mission of this ESA laboratory was in 1983 on the Space Shuttle Columbia. It is in two parts: a pressurized workshop which can hold five astronauts and pallets which hold scientific instruments. 55% of the cost of building Spacelab came from West Germany, its major builder. It has proven to be a very successful way of conducting scientific, materials processing, and Earth observation experiments.

These are only a few of the European Space Agency projects. Others involve cooperation with NASA and such international organizations as EUMETSAT or INTELSAT.

Europe's Space Problems

The biggest problem which Europe now faces in space is financial. Some of her major space projects have been taking longer to develop and produce and costs are rising proportionately. This is giving rise to some reassessment of their individual contributions in the Finance Ministries of the ESA Member States as to what their future financial commitments to these projects will be.

West Germany has been attempting to convince the other European space powers to stop production on the Hermes shuttle and replace it with its creation, the Sanger. This is a shuttle designed in West Germany which operates as the next generation of U.S. shuttles will: it takes off like a plane and puts space vehicles into orbit. The United Kingdom has already made it clear that it does not intend to increase its $200 million annual space budget and that it is not intending to support the three major projects. The British Minister for space affairs, Kenneth Clarke, was critical of the costs of the programs in the meeting at The Hague, and expressed the opinion that they were duplicating work already done by the U.S. and Soviet programs.

The manned v. unmanned space program dispute which has gone on in the U.S. is also taking place in Europe. The scientific community believes that money to be spent on manned flight could be better spent on scientific programs and on automated space vehicles. In a report published by the French Academy of Sciences the statement is made that man in space "is not particularly useful, and would even be a disadvantage, in most space-based research." They believe that most programs can be worked more efficiently and productively from Earth control and that the extra costs of manned flight are not worth the gains.

However, also as in the United States, the argument comes down to the fact that politically and in terms of national or regional pride, scientific experiments do not gain the public interest of manned flight. The Academy of Sciences report went on to say that "It appears perfectly legitimate that France and Europe want to take part in a human adventure that acts as a powerful theme of international cooperation, and also to play a full role in the interplanetary flights of the next century."

In the view which made the day in The Hague, French Prime Minister Jacques Chirac said at a scientific meeting in Paris "the conquest of space, like the exploration of the oceans, or the fight against the worst diseases, is indispensable not only to maintain enthusiasm -- the basic sign of life of a society -- but also to provide the dream without which no nation, no people, can claim to be truly great."

Jack Leeming, Director-General of the British National Space Center, has said: "We're not against man in space, but we're against the proposal that we should achieve autonopmy by the year 2000." The U.K. has been opposed to the Hermes project and has questions about Columbus and Ariane 5. Leeming said that the U.K. is more interested in the launching of satellites than of manned missions.

West Germany's scientific community has also expressed doubts about the benefits of an expensive manned program compared to the gains to be realized if the same investment were to be made in scientific research.

Europe has found it necessary to scale back some of its projects and may have to do so even more if the Member States of ESA pull back on their financial commitments.

The Soviet Union and Europe

One of the more problematic areas with which the United States must deal is the new, increasingly cooperative relationship between Europe and the Soviet Union. The U.S. is in danger of being isolated from some of the space activities in which Europe will be involved in the next decade. The Soviet Union is willing to sell its technological know-how for Western currency while the United States attempts to hold on to its technology of the future rather than transfer it to any other country, including the Europeans. Interestingly enough, however, when the U.S. Government released its recent list of technologies which are considered critical to national security, space technology was notable for its absence from the list.

As with all areas of technology, in fearing the transfer of our technology to other States, or through other States to the Soviet Union, we lose opportunities for cooperation and for the cost effectiveness and long-term benefits which come from such cooperation. In this, we could learn a lesson from the States of Europe which, in combining in the European Space Agency, have been able to each concentrate on the technologies which each does best and to cut the cost of being involved in space exploration.

The U.S. needs a consistent policy on technology transfer, one on which the Europeans can depend and make their own future plans. Without such a policy we are lessening our ability to engage in cooperative, international activity with Europe as well as with other regions of the world.

Europe 1992

The Single European Act, containing major amendments to the 1957 Treaty of Rome, and creating a single European market by the year 1992, entered into force in July 1987. It gives the European Community "specific powers in the field of scientific and technical cooperation". In so doing, the EC admits that Europe does not hold a lead in most of the important fields of research and technological development. They have recognized that the only way that they can become leaders in more of the scientific and technical fields is to cooperate and to coordinate and combine their available resources.

The EC's Joint Research Centre (JRC), was established under The European Atomic Energy Commission (EURATOM) in the late 1950s to conduct research in nuclear fission energy. It has since expanded its work into a number of other areas, including remote sensing. Under the Single Act, a framework program of research and technological development for the period 1987-1991 was established to help the EC work effectively in eight specific fields. In a number of these, space technology plays a part: Quality of Life, Telecommunications, Commercial Manufacturing, Optimum Use of Biological Resources, Use of Science and Technology for Development, Exploitation of the Sea Bed and Use of Marine Resources, and Improvement of Cooperation in Science and Technology. The European Space Agency is the institution through which the cooperative space element is carried out.

There are some financial experts in Europe who foresee numerous potential problems emenating from the creation of the single market. Their fear is that, rather than creating the "Fortress Europe" which so many Americans and Japanese fear, Europe will lose its protection from outside investors without a fair exchange. Thus, in many specific aspects of economic interaction between countries, one reads and hears in speeches the concern that European institutions will not receive "national treatment". That is, reciprocal treatment in other countries equal to the treatment accorded that country's national institutions.

In a report entitled Research on the Cost of Non-Europe which was begun in 1986 and completed two years later, a group of European economists analyzed the possible economic prospects to be realized from the single European market of 1992 and beyond. Although they did not try to predict its effect on the outside world, they did predict that subsidiaries of foreign firms in the EC would profit equally with European firms, giving U.S. firms already established in Europe and involved in the space industry an advantage. They also predicted that the removal of the internal economic barriers in the EC would be to the advantage of foreign firms in conducting their business in EC countries.

There is no question but that Europe, and particularly the Federal Republic of Germany, is looking Eastward to increasing economic arrangements with Eastern Europe and the Soviet Union. The extent to which Germany is doing this is a potential source of conflict between Germany and other European states, particularly France.

Implications for the United States

Just as Europe learned a lesson from the United States, so we can learn from them. As we united a group of colonies and territories to form a nation, so they have united a group of sovereign States to form the European Community, an economic revolution with political overtones and effects. 1992 now affords the EC an opportunity to restructure and reorganize their joint and individual public sectors, industry, and financial institutions.

We must not forget that the United States must remain competitive, not just with Europe, but also with the Pacific Basin countries, particularly with Japan. For example: in 1985 the European Community imported 61% of its computers from the U.S. By 1987, it was importing only 49% from the U.S. and 25% from Japan. That trend, in whatever product or industry, is not going to reverse itself without some hard planning and work on our part.

United States Leadership

Whatever the role of the European Community in space exploration, the United States needs to look to itself and to its failure to set long-term goals in space. We need to look at the previously lost opportunities for leadership and progress in space and to learn from our mistakes.

Landsat. Our Government privatized the Landsat earth resources satellite system without a clear knowledge of the presently available market for Landsat images -- and without being precient enough to realize the extent to which what was to happen in Europe in a very few years would affect that market. So when the French SPOT satellite was put into orbit and began returning 10 meter images, we were unprepared for the consequences and there was consternation in Washington. The French were offering higher resolution images for sale to the commercial market while the United States still had a control on the allowable resolution written into the Commerce Department regulations on commerical satellites. In reaction to SPOT we have now changed the regulations and Landsat 6 and 7 will make higher resolution images available -- if the system survives. [The Soviet Union is now marketing 5-6 meter images to the commercial market.]

In March the two operative satellites, Landsat 4 and 5, were almost turned off because the private company, EOSAT, cannot operate them without Government funding. It is difficult to believe that in a field which we pioneered, we are willing to allow the United States to be without operational remote sensing satellites and to put outselves out of the commercial market for satellite images. This incredible occurrence came about because of our shortsightedness and our failure to engage in long-term, stable policy planning in the space field.

Now on a temporary reprieve, the Landsat satellites will be in danger of being turned off and America's earth resources remote sensing program in danger of disappearing on a regular basis unless we begin long-term planning -- and financing -- for our space activities.

Space Shuttle. As the Challenger accident in February 1986 made painfully clear, our shortsighted dependence on manned craft while neglecting expendable rockets has put us at a disadvantage in the international marketing of launching services. We even have a long waiting list of our own satellites and scientific experiments, long overdue to be orbited. Meanwhile, the European Space Agency's Ariane rocket has captured over half of the launching business in the world. While they have had some expensive failures of the rocket, human lives are not lost in the process, and the time and expense involved in correcting the mistake is considerable less than what is involved with the space shuttle. We are just beginning to build an expendable fleet and in the meantime valuable scientific experiments like the Hubble Space Telescope wait for the Space Shuttle to include them in its payloads.

Now the Soviet Union and China have become rivals in the launch business and, as competition heats up for launching services, we still wait for the shuttle to be safe enough to carry human lives.

Lunar Program. After the spectacular success of the Apollo Lunar Program and the public support which it engendered for the space program in general, we failed to capitalize on it and to build upon the knowledge and the support which it brought.

Scientific Programs. We are only now realizing that we have failed the scientific community and the advancement of human knowledge by inadequate support for scientific exploration of space. Let's not compound the problem by supporting present scientific efforts to the end of a funding period, and then lose interest and turn to other programs, allowing scientific programs to languish once again.

We need to set out goals, as NASA is attempting to do with Mission to Planet Earth, to give then long-term funding, and to support them in Congaress, in the media, and through public education and interest.

Conclusion

Perhaps I can best sum up my suggestion in one sentence: Let's look to ourselves, plan our goals both as a nation and as a spacefaring nation, and do the long-term planning which is required to carry out those goals. We must guard against the temptation to react to outside events. The Hearings which the Committee on Science, Space and Technology is holding are an good beginning to reassessing the role and the leadership position of the United States in the international community, both economically and politically.

If we lose our competitive position in Europe or elsewhere in the world it will not be as a result of the Single European Act or any other regional action: it will be as a result of our own inaction.

What Europe 1992 can do for the United States is to give an impetus for reassuring America's policies, technologicall, and industrial capabilities and to set a vision for our own future in space.

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The **CHAIRMAN**. Thank you very much, Ms. Sullivan.

Questions. The gentleman from Missouri.

Mr. **VOLKMER**. Thank you very much, Mr. Chairman.

Dr. Ginsberg, it appears that you see that some of the most serious problems affecting our relationship with the EC after 1992 will be the questions of content, origin. We presently have those, do we not? We have those same problems right now.

Dr. **GINSBERG**. That is right.

Mr. **VOLKMER**. Now how do you see those problems? Just a continuation of an existing problem, or do you see an exacerbation of those problems?

Dr. **GINSBERG**. Well, the European Community is now thinking about these rules and the extent to which it might be tightening up these rules, and that is what our main concern is, that we may have different definitions in the future of what constitutes sufficient European content to enable U.S. firms, for example, to participate in public procurement contracts, so on and so forth.

So it is a great concern because the Commission, for example, is proposing rules that could adversely affect our interests in the future. So this is the time for us to discuss with the Europeans their proposals so we can have some influence.

Mr. **VOLKMER**. Do you envision, as I do, that some time after 1992, not right at 1992 but some time after 1992, that within the European Community, in other words, just as long as it is European Community content? Is that correct?

Dr. **GINSBERG**. Excuse me?

Mr. **VOLKMER**. That it will have to have European Community content.

Dr. **GINSBERG**. Yes.

Mr. **VOLKMER**. And the origin would have to be within the European Community.

Dr. **GINSBERG**. Correct.

Mr. **VOLKMER**. So that you could have procurement, public procurement, like French, and your telecommunications from Germany or England. Right?

Dr. **GINSBERG**. Right.

Mr. **VOLKMER**. But not from the United States.

Dr. **GINSBERG**. Well, the current Commission proposal on public procurement would impose a 50 percent local content requirement for non-EC firms. It also would propose to extend rules on public procurement to sectors not currently covered by the GATT—telecommunications, water, energy, and transportation—and here is the problem.

Since there are no rules currently on public procurement with regard to telecommunications, water, energy, and transportation unless the Uruguay Round currently in progress deals with this, the Community will be in a position to demand reciprocity or national treatment of foreign firms wishing to gain access to the EC market for these products. So this is a great concern.

Mr. **VOLKMER**. Now, presently, the way I understand it, many, if not all, of the EC countries not only on public procurement but on some specialty items already provide individually for their countries content legislation, in other words, content requirements. Is that correct?

Dr. GINSBERG. I believe so.

Mr. VOLKMER. What do we have similar in this country at the present time on our public procurement as far as content or origin, besides "Buy America"?

Dr. GINSBERG. Mr. Congressman, I was going to mention the "Buy America," because that is the one that the European Community uses the most often to criticize U.S. procurement policy. I am not an expert on U.S. public procurement policy, but I would defer to any other members of the panel that might be.

Mr. VOLKMER. Dr. Sullivan, or to be Dr. Sullivan, earlier in our first panel we discussed the R&D—research and development—in the EC. Let us look at it from the space R&D. Do you see eventually one effort by the EC in space R&D following ESA, or do you see each individual country like France, and West Germany, and England, and the rest of them going ahead on their own also?

Ms. SULLIVAN. I think they will continue their national policies and their national development of space technology also. I do not think that Britain is going to give up its space plane nor is West Germany going to give up its Sanger in order to allow, you know, a joint project to take precedence. I think they will both go on at the same time, certainly into the foreseeable future.

Mr. VOLKMER. Okay. Thank you very much. Thank you, Mr. Chairman.

The CHAIRMAN. I thank the gentleman.

Mr. Tanner.

Mr. TANNER. Thank you, Mr. Chairman.

If any of you all were here, I asked the earlier panel if the efforts we are presently undertaking to coordinate the various functions and opinions among the various departments of the Federal Government and the various agencies thereof are, in your opinion, adequate. And we were told by the earlier panel that the Office of the U.S. Trade Representative is attempting to do that. One, is that the proper place for our dialogue with the EC? And, two, are they doing what we need to be doing now as a nation as it relates to this entire situation? To any of you.

Dr. GINSBERG. Mr. Congressman, I am glad you have asked that question, because that is something I would like to address the committee. I think it is wrong, I think it is inappropriate, for the USTR to be at the helm of U.S. policy toward the European Community because, in essence, when you have the USTR at the helm of U.S. policy toward the European Community, U.S. commercial interests will dominate the U.S. agenda with the European Community. And I have argued in my testimony that we have got to have a balanced relationship with the European Community that takes into account the whole constellation of ties with Western Europe from trade, to security, to diplomacy, to foreign policy. And I am afraid that the battle that I believe has been waged in these last few months between the USTR and the Department of State over which agency will coordinate and be at the helm of U.S. policy toward the EC, the USTR has won out. And, in my opinion, that puts U.S. relations with the European Community into a much more narrow tunnel vision than I think is required.

The European Community is no longer just a customs union, it is more than that, it has a political personality, it takes foreign policy actions that often differ with U.S. policy, and we need to have a balanced, rounded policy toward the European Community. And I hope that in the interagency task force the State Department, other agencies that have a broader perspective might influence U.S. policy in this direction.

Dr. RALLO. If I could just also add, one of the problems, when you are dealing with security, is the fact that there is a very insular and insulated group of individuals—I used to be one of them—who deal with the security perspective, and we all speak a very arcane language, and we all know each other, and we all travel the same circuit.

What is missing, and one of the things that I address here, is the fact that many things that NATO says are going well is because they just speak to other people in that system. And what we need to find now is a way of getting the NATO security dimension and the Western European Union, the IEPG, and all the people that know each other hooked into the ones that we are talking about. In other words, there has to be far greater interaction between these separated pieces, and security is probably the worst issue to deal with.

Dr. GINSBERG. May I also make one more statement?

Mr. TANNER. Yes.

Dr. GINSBERG. We do not have an assistant secretary of state for European Community affairs, and I think if we did that might help provide us with an overall framework for the conduct of relations with the European Community. We lack this framework, and we need it very much, and I think that, when all is said and done, for the agencies of the Federal Government that are now going through assessments of the impact of 1992 on U.S. interests, this is a time for the United States Government to be formulating a new, more cogent, more effective policy toward the European Community. And my concern is that this is the opportunity to do so, and I hope that we do not lose it. And I do believe that when the Secretary of Commerce makes the statement publicly that the United States should have a seat at the deliberations of the European Community when it considers these directives for 1992, it is not terribly effective, because we do not ask the European Community to participate in our deliberations on trade policy.

I think it would be more effective if we took a more proactive approach with the Europeans in dealing with our interests. The EC Commission has always been a rather open agency in terms of welcoming and listening to concerns of foreign governments and foreign businesses.

The CHAIRMAN. Will the gentleman yield?

Mr. TANNER. Yes, sir.

The CHAIRMAN. I thank the gentleman for yielding.

It seems to me that is a divergence, which does not surprise me, with the State Department this morning. You heard their testimony. They took the point of view that everything was fine and we are all negotiating in good will, and we will let this happen, and as each directive comes out we will review the directive, and so forth, and so on.

Again, if I may say to the witnesses, we thank you for participating. We are trying to get across to this whole Congress and the administration that 1992 is for real, and, again, without too much reiteration, if the gentleman will continue to yield, we observed that very, very clearly in the superconducting supercollider in CERN. They were buying and going to do everything that should be done in Europe, with the exception of things they had to get outside that they could not produce or did not choose to produce.

So if that has already started to generate in the combined, you know, nations' efforts, what does that mean down the road? That is where we are trying to come from, and I think it is a very legitimate question at this point.

The gentleman from Tennessee.

Mr. TANNER. Thank you, Mr. Chairman.

So you would suggest that consideration be given to a new position in the Department of State to deal with this particular set of circumstances.

Dr. GINSBERG. Yes, I do.

I think that our policy toward the European Community is anachronistic. We often treat the EC as it was an organization in the fifties and sixties, but we are entering the nineties, and the European Community is a far different animal now than it was 20 years ago, and no matter. I think that our policy is anachronistic, and it is time that we realized that the Community is here to stay and that it will be more effective for the United States to more cogently deal with the Community for what it is, not for what it—we thought it would become or what it has not become. It is, indeed, our largest trading and investment partner, and its members share with us a strategic security relationship. We need to address that, and particularly with regard to 1992 this is going to strengthen the central institutions of the European Community, and thus we need to beef up our effort in Brussels, and I believe that the time to do that is now, not in 1993.

Mr. TANNER. I could not agree with you more.

Just as one observation, Mr. Chairman. On many of these hearings that we have had the Department of Commerce comes up again and again, it seems that we run into a roadblock there on HDTV, on Landsat, on FSX. I do not know what this committee can do about that situation, but it seems to me that we have a weak link in some of the negotiations that Commerce has been involved in.

Be that as it may, Dr. Rallo, your statement, I thought, was excellent and right on point as it relates to NATO and as it relates to the attitude perhaps of the European Community in light of the Soviet Union's recent supposed change of attitude as it relates to Gorbachev's pronouncements. Could you expand a little on—I saw, and maybe I am sensitive to this because I went to West Germany just two or three weeks ago on the Secretary of the Army's Quick Look Program. I see a very pronounced attitude or perception on the part of the Europeans toward wanting to embrace the Soviets' moves, and I do not think that bodes well for us as it relates to this overall question. Is there anything we can do now as a country, that you see, to expand our influence? Because, as you suggest in your paper, the question becomes much broader and NATO becomes less relevant as it relates to their attitude toward us and vice versa.

Dr. **Rallo**. Well, you know, again, you are raising the type of thing that just expands just outward, but let me give some examples. In the longer paper, I point out, toward the conclusion, that right now we are losing the public relations. If you look, for example, Mr. Kohl and Mr. Gorbachev are agreeing on the concept of denuclearizing Europe at the same time that our President, which is supposedly Mr. Kohl's ally, is saying that we have to maintain some nuclear assets.

Now from the perspective of the security, and I will use the word "professional," the hat I still do wear, what Mr. Bush is saying makes a lot of sense, but from the academic perspective Mr. Bush's words are falling on the ears of people increasingly who do not want to have nuclear weapons in their backyard.

So I can not answer it easily, but what I can suggest is that we have to be far more sensitive to the fact—and that is one of the things I raise over here—to the fact that Europeans, yes, they are like us, and they share many traditions and what-not, but they have different concerns, and we can not just simply say what is good for them is good for us and vice versa.

That is a rather bland way of answering. I can give a lot of specifics, but it would go far beyond. It really is an educational notion, and I support what Roy was saying a few moments ago: We have to recognize that 1992 is a new era, it is not merely a linear continuation, and we have to recognize that and try to translate that out.

Mr. **Tanner**. I thank the chair.

The **Chairman**. I thank the gentleman.

The chair recognizes the distinguished gentleman from California, Mr. Campbell.

Mr. **Campbell**. Thank you, Mr. Chairman.

Dr. Ginsberg, you could help me, if you would, in understanding the procurement code in GATT. As I recall, in the late seventies we had a procurement code agreement in GATT. It may not have been tremendously effective. Nevertheless, you made a distinction in your delivered testimony on that procurement code dealing with telecommunications and two or three other industries. I would like your enlightenment as to how those are separated from the GATT procurement code. How is it that they can be treated differently from the general rules that were adopted at that time?

Dr. **Ginsberg**. Yes, Mr. Congressman. I am not an expert on the GATT procurement code. I do know that water, energy, telecommunications were never included in that code. Thus, the European Community—unless the GATT Uruguay Round extends the coverage of the procurement code to these areas, the European Community will be in a very, very strengthened position when it negotiates bilaterally with other countries for access to, for instance, telecommunications. At that time, they will be able to demand either reciprocal treatment or national treatment. National treatment means—

Mr. **Campbell**. I take your point. Let me interrupt, please, if you do not mind, just to get to the question.

Dr. **Ginsberg**. Please.

Mr. **Campbell**. So that you were pointing out a difference, of which I will admit I was unaware, that in the 1970's GATT procurement code telecommunications was explicitly excluded. That I was not aware of, but I will be very interested if that were the case.

Dr. GINSBERG. As I said, I am not an expert on this question, and I would prefer to refer to any of the other panelists.

Dr. RALLO. I believe there were many exceptions or, rather, noninclusions into the GATT services, amongst them agriculture, things along those lines.

Mr. CAMPBELL. I recall the services exception; I just did not recall telecommunications.

Dr. RALLO. Yes.

Mr. CAMPBELL. All right. That is certainly worth pursuing. Thank you, and pardon me for interrupting, but I just thought I would cut to it.

Mr. GINSBERG. Please.

Mr. CAMPBELL. The second is the NTB's, the nontariff barriers. We have got already an agreement for the reduction of tariff barriers, and I do not see Europe '92 as changing that a whole lot. It is rather on the NTB side, at least in my judgment.

Dr. GINSBERG. That is correct.

Mr. CAMPBELL. And I am wondering if you could identify what you think is the principal NTB which is not going to be present after Europe '92, which presently is, to the participating members of the EEC.

Dr. GINSBERG. What nontariff barriers will remain after 1992?

Mr. CAMPBELL. No. What are the principal ones that will be removed by reason of Europe '92?

Dr. GINSBERG. Oh, most definitely the customs formalities. You know, so much waste of time and resources are made at the frontiers of the European Community countries. By eliminating customs formalities, that will ease the flow of trade and reduce costs. Indeed, the Europeans now have a single customs administrative document that replaced 150 such documents and so that is very exciting and, I think, very important.

Mr. CAMPBELL. I thought you might have said that, and so my follow-on was, to that extent then, if it is a nontariff barrier and it is a question of a customs formality and Europe maintains a different customs formality vis-a-vis the United States than it does members of the EEC, why would that not constitute a GATT violation which is grievable by the United States within the GATT procedures?

Dr. GINSBERG. It is my understanding that the GATT provides for the European Community to take such action within the customs union unless the United States can prove harm to its trade as a result of the elimination of these customs barriers.

Mr. CAMPBELL. I am going to make the point a little more carefully perhaps than I did. If we are speaking here about nontechnical, specific tariff differences but, rather, nontariff barriers, such as how long you have to wait at a particular port of entry, what customs inspectors are available, and if it becomes a pattern that your own customs union is treated more favorably than imports from outside, that would be a GATT violation, and so I am suggesting or I am asking you, if that is the case, why you are pessimistic about our ability to grieve that through the GATT procedures.

Dr. GINSBERG. We would have to show damage—we would have to prove damage to our trade, and we wouldn't be able to do that until perhaps years after 1992 in order to prove the damage.

Mr. CAMPBELL. I am all for expedited hearings on trade. Once again, though, the proper reaction, it should seem to me, would be a section 301 action by the United States against imports into this country as a way of responding to unfair aspects of trade by a foreign government. Would you not agree that that would be a useful vehicle?

Dr. GINSBERG. That would be a possibility.

Mr. CAMPBELL. The last question I had was the European Currency Unit. To the best of my studying of Europe '92, despite their best efforts, that ain't about to happen. Pardon my grammar. Is that about your perception as well?

Dr. GINSBERG. Well, the ECU—the European Currency Unit—is the monetary unit for budgetary purposes in the European Community. You can purchase bonds in ECU, but, of course, it is not yet a currency, and my opinion is that the Community is not going to achieve all its goals of completing the customs union unless it can agree, not to eliminate the members' currencies, but to have the ECU exist concomitantly with the member state currencies, and that is my opinion.

Mr. CAMPBELL. But to make that happen—and perhaps I could address this to Dr. Rallo as well—each member of the EC would have to give up control over its monetary policy and essentially agree to that which they have not agreed since the days of the gold standard, a fixed exchange between their currencies.

Dr. RALLO. Just briefly, I have received checks from private individuals written on ECU. The value of the ECU is the fact, particularly for commercial transactions, that you minimize the need to—you know, you have been to Europe, you have changed money, and you always lose money. So if you have an ECU that you can have as a substitute, which is one of the concepts, saving money, as far as in the marketplace, it is a learning experience. I have been to places—well, Brussels; that may be artificial—where it will be in the store windows denominated both in Belgian francs and in ECU. So, you know, I think part of it is a learning process, although if you go to an Italian market or a Greek market, you may have a harder time. It will happen though.

Mr. CAMPBELL. I want to thank the chairman for his courtesy and also for your insight in holding these hearings. Europe '92 deserves a lot more attention than it has been getting, and I am very glad you undertook this leadership.

The CHAIRMAN. I want to thank the gentleman.

The chair recognizes the distinguished gentleman from Alabama, Mr. Browder.

Mr. BROWDER. Thank you, Mr. Chairman.

I have a question that Dr. Ginsberg or Dr. Sullivan might answer. It is a general question. You know, we are talking about the future effects on American competitiveness in technology and science resulting from Europe '92. Generally, how does our comprehension or approach to Europe '92, this potential significance, how does that differ from the rest of the world, say the Soviet Union or the Japanese—their comprehensive, their attitude toward Europe

'92? We are getting mixed signals today from the academic community and from the executive departments. Could you comment on how the rest of the world comprehends or approaches Europe '92, how that differs from our approach at this point?

Ms. **Sullivan**. Yes. I think that the United States still thinks of Europe in terms of sort of a second-class citizen in a sense, somebody for whom we need to do things, a number of countries whom we helped through the Marshal Plan and we are still helping. We are not thinking of them as partners. I think the Soviet Union is looking more in terms of partnerships. They are certainly sharing more space technology, or intending to, than we have talked about with Europe, and I think, again, it is that attitude difference here that we have not looked at Europe as it is now and as it is going into the future.

Dr. **Ginsberg**. I think Japan and the newly industrialized countries—the NIC's—might be much more of a target of the European Community's 1992 plan than U.S. firms, and I think that that has got the Japanese and the NIC's quite worried that the European Community will, for instance, under the 1992 plan, substitute individual members' import quotas on certain Japanese products with European Community-wide import quotas on certain Japanese products.

So I think we are in a much better position because we have been investing in the European economy for 40 years, we have a huge presence in Europe, and our American firms over there are considered European firms. Japan has only recently begun to invest in Europe in order to get around any future barriers to trade with the European Community. So I think the Japanese are quite concerned. We will see a lot more Japanese investment in the European Community.

I think the Soviet Union is paying a lot more attention to the European Community. Indeed, last year the European Community and COMECON established diplomatic relations for the first time in the post-war era. It was symbolic, but it showed how much the Soviet Union is now paying attention to the European Community, not so much as a patron of the—as a client of the United States but as an independent actor that the Soviet Union must come to grips with in Europe and the world.

The developing countries? Very, very dependent on the European Community for access to the European Community market and for the continuation of European Community assistance to these countries. So they are very eager to watch it. The industrial side of 1992 does not affect them so much, more the agricultural side, and so the world is watching the European Community. And it is not surprising to learn that the European Community has diplomatic relations with over 130 countries, so that these countries have representation in Brussels to lobby for their interests.

Mr. **Browder**. Thank you, Mr. Chairman.

I think that that is something that we should be concerned about on this panel, not only unilateral concerns of the United States and Europe '92 but that it is broader than that, that we are facing competition and constraints beyond just our relationship with Europe '92.

Thank you.

The CHAIRMAN. Do any of the other Members have any further questions?

Let me just make one, and then we want to thank you for being with us. It seems to me to be axiomatic that if the Europeans are going to create their common market, if you like, and formalize it in 1992, obviously they are doing that for a reason. And I think that the assumption that that is just something that we are doing housekeeping with, that we heard earlier from our witnesses, is a very gross mistake and understanding to begin with. And it seems to me that as we talk of science, space, technology, and education being the foundation to create the new wealth of this country and the economic dynamics of this country, that the two major marketplaces we are going to be dealing with, one is Europe obviously, and the other is the Pacific Rim. And it seems to me that if the Europeans can get their act together—which they are doing a good job of at this point—that they are not only going to become our major marketplace but going to be our major competitor as far as this country is concerned, as far as our situation in the Pacific Rim is concerned.

So I think, from my point of view—and we are going to have more witnesses tomorrow—that we are making a very serious error in judgment by not getting on with this issue now to understand what it really means. And I think the point that Dr. Rallo was making, the impact—the comment made earlier was, well, really, it does not have any impact on the military because, for all intents and purposes, it is an economic issue, and nothing could be further from the truth, because the economic issue is the foundation of the military issue in the first place.

So it seems to me that the red lights, caution lights you put up, make a great deal of sense. It is going to totally alter the relationship as far as NATO is concerned, which is going to have all kinds of ramifications and policy changes in this Nation. At least that is my point of view or observation of the whole thing.

Mr. VOLKMER. Mr. Chairman.

The CHAIRMAN. The gentleman from Missouri.

Mr. VOLKMER. I do have a question in light of what you said. I, too, agree that to strengthen the European Community and make it more competitive in the world financial, manufacturing, and everything else, is what one of their purposes is, and I have heard witness after witness say this does not mean a "fortress Europe." But if it does not, then why is it necessary for the Japanese to move in? Why is it necessary for us to tell all of our companies, "You had better get in there and get a presence, or else you are not going to be able to play the game"? Why are we doing that? Does somebody want to answer that? If it is not going to be a "fortress Europe," why is it necessary to have a presence?

Dr. GINSBERG. Well, it will not be a fortress if firms now—foreign firms invest in the European Community, and it is not likely to be a "fortress Europe" for the United States in that we have this tightly knit interdependent relation with the European Community. We are each other's major trading partners and investment partners. There is just too much at stake to imagine that, in terms of the total picture, that there is going to be a "fortress Europe" or, indeed, a "fortress America."

There are some specific problems like local content, reciprocity, access to public procurement markets, that we need to inform the Europeans now about in terms of our concerns. But I think for us to fear vastly increased protectionism in Europe after 1992 is a misplaced fear only because the EC has so much at stake in foreign trade itself.

The CHAIRMAN. But if the gentleman would yield.

Mr. VOLKMER. Yes.

The CHAIRMAN. By the same token, if I—and there are so many issues we would like to cover this morning—if I were in Europe and I was running a business today, why am I doing this? I am doing this because I want to be able to create a much more competitive position, and if I am going to reduce my costs then I am going to be more competitive, and where am I going to sell it to? Just to the Europeans? Of course not. The United States is their biggest trading partner. So there is bound to be an economic—whatever you want to call it—a economic dislocation, whatever, is going to happen, it has got to happen. Go ahead.

Mr. VOLKMER. Along that line, at least some of the reading that I have had, a vision, a possibility of what we have seen in this country in the last 10 years, starting to occur after 1992—in fact, it may already be starting to occur, but after 1992 it would precipitate more mergers, conglomerates. Do you agree with that or disagree with that—within the European Community?

Dr. RALLO. The whole concept of mergers has been one that has been ongoing within the European Community. One of the things that makes the current mergers a little bit different, and as going to your question, is the fact that a fortress mentality can be the overt or the very visible protectionist measures, but a fortress mentality can also be that now your firms, because they have merged, are capable of providing that which you had purchased overseas, and that goes to much of the heart of the question. The Europeans now, particularly with their technology emphasis, are going to position themselves that they, as you mentioned with the CERN, for example, can provide, particularly in the area of technology, many of the things they purchased from us.

So it is correct, it is not a fortress mentality, they are going to keep us out, but, on the other hand, they are going to give a priority, because of these mergers and structural changes, including financial issues, trade issues, and what-not, that are now allowing those Community firms to provide things—that is where the mentality comes in—much as we do in our own "Buy America." You mentioned "Buy America" acts. I mean the preferences we give to defense technology firms, amongst others.

So that becomes the problem. In other words, even though American firms may be positioned in Europe, as they have been for a long time, they are going to be increasingly excluded because much of the pot of gold, if you will, is going to go to European firms that now have the capability through mergers and structural changes to produce those goods rather than having to buy them elsewhere.

Mr. VOLKMER. Thank you, Mr. Chairman.

The CHAIRMAN. Well, I want to thank the witnesses very much for your being with us this morning and giving us the good insight and the overview of this most important issue. We want to thank you, and we appreciate your testifying.

On that basis, ladies and gentlemen, the committee stands adjourned until tomorrow morning. Thank you all for being with us.

[Whereupon, at 11:37 a.m., the committee was adjourned.]

EUROPE 1992 AND ITS EFFECTS ON U.S. SCIENCE, TECHNOLOGY AND COMPETITIVENESS

WEDNESDAY, MAY 17, 1989

U.S. HOUSE OF REPRESENTATIVES,
COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY,
Washington, D. C.

The committee met at 9:39 a.m. in Room 2318 of the Rayburn House Offices Building, the Honorable Robert A. Roe presiding.

Present: Representatives Roe, Schneider, Sensenbrenner, Brown, Browder, Ritter, Walgren, Hayes, Price, Volkmer, Tanner, Buechner, Morella, Walker and Valentine.

The **CHAIRMAN**. The hearing will come to order.

There are other members on their way here. There are three or four major functions going on this morning.

Yesterday, we held our opening hearings in Europe 1992. They were very productive, and we are looking forward to hearing from the other side of the equation having to do with the Secretary, who is with us this morning, in reference to the Department of Commerce.

I have no further opening remarks to make. I want to welcome the Honorable John Shaw here this morning. We are looking forward to your contribution to this effort. The Chair recognizes the gentlelady from Rhode Island.

Ms. **SCHNEIDER**. I, too, am going to refrain from opening comments so we can hear from our distinguished Deputy Secretary. Thank you.

The **CHAIRMAN**. Are there any other further comments?

[No Response.]

The **CHAIRMAN**. If not, the Chair recognizes the distinguished Secretary, Mr. Shaw.

[The biographical sketch of Mr. Shaw follows:]

JOHN A. SHAW

John A. Shaw has served as Associate Deputy Secretary of the Department of Commerce since the beginning of the current Administration.

Prior to his appointment, Mr. Shaw served as Senior Advisor to the Administrator of the Agency for International Development, as Vice President for Washington Operations for the Hudson Institute, and as Senior Fellow in Middle Eastern and International Business Affairs at the Center for Strategic and International Studies. He was a Senior Associate and Team leader for the management consulting firm of Booz, Allen, and Hamilton in planning the industrial cities of Jubail and Yanbo in Saudi Arabia, as well as serving as a senior executive in several international consulting, merchant banking, and manufacturing firms.

Mr. Shaw also was an Assistant Secretary of State and Inspector General of Foreign Assistance under Henry Kissinger and served on three senior White House Staffs. He has a B.A. from Williams College, and has an M.A. and Ph.D from Cambridge University.

STATEMENT OF THE HONORABLE JOHN SHAW ASSOCIATE DEPUTY SECRETARY OF COMMERCE, U.S. DEPARTMENT OF COMMERCE, WASHINGTON, D.C.

Mr. SHAW. Thank you, Mr. Chairman, and good morning.

I am pleased to be here this morning to discuss the challenges as well as the opportunities posed by EC 92. I will make some brief remarks, and mercifully save you from the longer version of my testimony.

Your hearing is very important, your hearing today, Mr. Chairman, for the reasons that I will outline below. I commend the committee for its interest and attention to the EC's activities at this stage.

The Department of Commerce has made EC 92 a high priority, and is working closely with other government agencies in the U.S. business community to ensure that the U.S. is able to take maximum advantage of the oncoming opportunities. We have been in contact with over 7,000 United States firms, most of which are small and medium-sized exporters, and have distributed over 60,000 copies of individual EC directives to them.

Mr. Chairman, the Administration's position on EC 1992 is simple and direct: We want EC 92 to succeed in creating a more open, competitive Europe, a Europe open to the world, as well as to itself. An economically stronger, more competitive, and technologically innovative Europe is in the interests of the United States. Europe has lagged behind the United States and Japan in developing commercially marketable technology. European research efforts have been hampered by small home markets, local shortages of technical expertise, and a lack of venture capital necessary to support major R&D investments.

The Community has responded by creating a series of joint R&D programs aimed at linking researchers and funding in the EC to increase the technical pace. However, in key technology centers, the Europeans are still playing catch-up ball with the United States and Japan.

The 1992 program has given new impetus to existing Community R&D programs, and has generated demand for new programs as well. Elements of 1992 address new directions for European cooperative research programs, and the development of regional standards in high-technology areas, such as telecommunications, information technology, and high-definition television.

As I have indicated, 1992 is having a stimulative effect on scientific and technical cooperation in the EC. This, along with other key aspects of the 1992 program that encourage reorganization and rationalization of design, production, and distribution systems, means that Europe will become a more formidable competitor to the United States and the rest of the world.

European firms will challenge U.S. companies for market shares not just in Europe, but elsewhere, and even in Asia. U.S. companies must recognize that these changes are beginning to happen right now, and not wait until 1992. U.S. companies, both those that produce in the EC and those that export, must avoid complacency. They must face the competitive challenge by reexamining their business strategies and taking steps to make themselves more competitive. This includes looking closely at R&D budgets and the stream of products in the design and pre-commercialization phases.

Now, Mr. Chairman, let me turn to the key question: What will happen to U.S. market access in EC 1992? Will it improve, or will we find that increasing openness in Europe leads to overt or subtle barriers that will lessen our access?

EC 1992 can only succeed if Europe does not increase external barriers. The drafters of EC 92 acknowledge this, and envision a Europe that is open; but there are many in Europe who have been accustomed to protection, and who are not enthusiastic about competing in more open markets.

As inefficiencies are exposed in Europe, there are bound to be losers as well as winners, and the losers can expect to seek protection with their governments, as they always have. Every day represents a new challenge for those in Europe who seek openness, and a constant struggle with those who do not. We must expect more narrow interests to prevail in some cases, and we must be prepared to protect our own interests.

We have significant concerns in a number of areas regarding EC 92. Particularly, a lack of transparency in the EC standards development process, and critical questions on whether testing and certification procedures will be operating in an open way.

Of all of the areas of concern to U.S. industry, the one raised most frequently is standards and testing certification. The EC is moving to a system which replaces 12 different national sets of technical requirements with one set. This is indeed good news. But the process of developing technical specifications in the EC is not an open one. It does not allow U.S. exporters to comment on draft standards, or to try to ensure minimal incompatibility between EC and the United States standards.

Access to the standards development process is particularly important in so-called "green field" technologies new to the market, or pre-commercial technology, where there is substantial room to shape future markets through the development of standards. Firms that get in on the ground floor in research programs that focus on developing these technologies will have an edge in determining what types of products will emerge from the commercialization process, and how those products will interface with other systems' components. The EC's initiatives to create a single, harmonized European product standard could be a competitive factor in world markets.

We are also concerned about the effects of EC government-supported development of HDTV and its possible effects on world trade and the entire electronic sector. U.S. firms are leaders in high-technology areas. We do not want to see this lead disappear as a result of the process being undertaken in the EC to integrate European markets in new technologies.

Open and non-discriminatory treatment of U.S. firms in the area of European testing and certification is also vital. Testing and certification procedures are the means of demonstrating conformance to standards.

Secretary Mosbacher is exploring ways to develop with the EC an openness to standards-related matters that will allow U.S. exporters access to these highly technical procedures, equivalent to what EC companies will enjoy. This will be a major aspect of the discussions in Brussels later this month.

An open system can do much to allay the concerns of U.S. companies, and he has made this statement on a number of occasions. A closed system, on the other hand, one that would slow U.S. product approval or make it more difficult or impossible to attain certification, would be one of the most serious trade barriers to us.

Advancing the long-term competitiveness of U.S. companies in global competition is a top priority for the Secretary, and the Administration is exploring ways that we can promote world-class research technology, product standards, and the private sector mechanisms that support them, so that U.S. companies can continue to compete in world markets based on commercial terms and the dictates of the marketplace.

We need to facilitate U.S. companies developing products for world markets, not just for the United States. Where appropriate, we need to make sure that U.S. business is involved in international standards development.

Mr. Chairman, in concluding my remarks, let me restate that we are extremely optimistic about EC 1992. We have problems and concerns that need to be worked out with the EC, but I assure you that we are not sitting around expecting the worst to happen. Instead, we are working actively with our European partners to see that the best happens, and with U.S. firms to have them take maximum advantage of the unfolding opportunities in Europe.

Thank you very much, Mr. Chairman.

[The prepared statement of John A. Shaw follows]

PREPARED REMARKS OF
JOHN SHAW
ASSOCIATE DEPUTY SECRETARY OF COMMERCE

BEFORE THE HOUSE COMMITTEE ON SCIENCE,
SPACE AND TECHNOLOGY
HEARINGS ON EC 1992

MAY 17, 1989

Mr. Chairman:

I am pleased to be here this morning to discuss EC 1992 and the important challenges and opportunities it presents. The Administration has made this issue a high priority. The Department of Commerce is working closely together with USTR, the Department of State and the Department of Treasury to address the challenges and to ensure that the U.S. business community is able to take maximum advantage of the opportunities.

Your hearing today is very important, Mr. Chairman, for the reasons I will outline below, and I commend the Committee for its interest and attention to the EC's activities.

Europe 1992 is the European Community's attempt to complete what it set out to do in 1958 -- to create a single $4 trillion market of 320 million people, without internal borders. The EC1992 program is comprised of 279 directives -- laws -- aimed at the free movement of people, capital, goods, and services within the EC. But EC 1992 is actually more than that. It is an attitude among Europeans that Europe can become a more dynamic economy.

These developments will have a far-reaching effect not just on U.S. exports and imports with the European Community, but on world-wide trade as well. The EC is the world's largest trading entity, accounting for 17 percent of world exports.

The EC 1992 program is also likely to have an effect on current U.S.-EC science and technology issues. Elements of 1992 address new directions for European cooperative research programs and the development of regional standards in high technology areas such as telecommunications, information technology, and high-definition television (HDTV). Developments in these areas may have a substantial impact on technology development and competitiveness in the EC.

Europe has lagged behind the United States and Japan in developing commercially marketable technology. European research efforts have bee hampered by the relatively small home markets of individual countries, local shortages of technical expertise, and a lack of the venture capital necessary to support major R&D investments. The EC began to generate a Community response to this in the early 1980s, creating a series of joint R&D programs aimed at linking researchers and funding in the EC to develop commercially marketable technology. The 1992 program has given new impetus to these existing programs and generated demand for new programs as well, some of which are currently being put into place. However, in key high technology sectors the Europeans are still playing catch-up to the United States and Japan.

Competition in high technology areas is just one aspect of the 1992 program that we are looking at in the context of the potential impact on U.S. business interests. The Commerce Department has made EC1992 one of its highest priorities. We have set up one-stop shopping to provide 1992 information, counseling, and assistance to U.S. business. Over 10,000 companies have taken advantage of the Department's program. We have distributed over 60,000 copies of individual EC directives and have provided marketing information to thousands of smaller and medium sized companies seeking to begin exporting to the EC or to extend their export marketing efforts there.

The Commerce Department has worked closely with trade associations to analyze the effects of EC directives on U.S. industry. We have just finished the first part of our analyses, covering 66 key EC directives. These analyses confirm other studies of 1992 such as the National Association of Manufacturers' that EC1992 should have a positive effect, but also raises significant problems in some areas.

Information is key to U.S. business. Changes in Europe due to 1992 are significant. Without reliable, timely information an open market can give the impression of a "fortress." We want to make sure that U.S. business is prepared for the opportunities.

When business looks at EC1992, there are three main questions:

1. What will happen to market access for U.S. exporters and investors? Will access become more open? Or more closed?
2. What will be the effect on competition?
3. What will be the effect on the growth of the EC market?

Overlapping all of these areas is the issue of scientific and technical cooperation within the EC, and the stimulative effect that 1992 may have on this cooperation.

Mr. Chairman, the Administration's position on EC1992 is simple and direct. We want EC1992 to succeed in creating a more open, competitive Europe -- a Europe open to the world as well as to itself. An economically stronger, more competitive, and technologically innovative Europe is in our strategic and economic interests. A single European market open to the world provides the best basis for growth in global business and multilateral trade cooperation.

EUROPEAN ECONOMIC GROWTH

There can be no doubt that the European Community needs the 1992 program. For too many years, EC member states have maintained barriers protecting inefficient producers -- standards aimed at restricting competition, excessive state subsidies, restrictions on the establishment of services enterprises, refusal to accept professional credentials across borders, and curbs on capital flows. These and other impediments have restricted innovation and competition, contributing to slow European growth. Since 1980, European economies have been growing at only 1.7% per year.

More recently, however, there has been a decided change. Since 1985, when the EC1992 program was created, European investment has risen sharply. Last year it rose nearly 10% in real terms as European firms began to modernize in preparation for 1992. European GNP has been affected as well. Last year's GNP growth in the Community was 3.5% -- the best growth rate in a decade.

Reflecting this growth and the effects of the decline of the dollar, U.S. exports to the EC last year were $75 billion, up more than 25% from 1987. Imports from the EC were up only 5%. As a result, our deficit fell over 50%, to $11 billion -- half the $22 billion deficit with the EC in 1987. In fact, one third of our global trade balance improvement last year was in our trade with the EC.

Faster EC economic growth is good for our trade with the EC, and I would like to see more growth. Implementation of the 1992 program in a way that opens markets in the EC can lead to the faster growth we are looking for. I am particularly encouraged by the rise in European investment in plant and equipment. Many of our exports to the EC are capital goods, and will benefit from this rise in demand.

EFFECTS ON COMPETITION

The investment boom, however, means that Europe will become a more formidable competitor. As European firms prepare for 1992 by merging, by increasing the amount and sophistication of their capital equipment, and by reducing costs, they will challenge U.S. companies for market share not just in Europe, but world-wide.

The EC's efforts to create a single internal market and become a more important world competitor are having a strong effect on U.S. business strategy to a degree that was unanticipated even a year ago. Today U.S. companies must consider the global competitive effects of a single internal market in the EC. Changes are beginning to happen now, not in 1992.

In a real sense, the best European companies have been American companies. U.S. companies long ago went into Europe with the attitude that Europe was one market. They have tended to set up European headquarters and have attempted to integrate production and distribution throughout Europe. In fact, we estimate that last year the sales by U.S. affiliates in the EC were about $550 billion. This, incidentally, is about three times as large as U.S. affiliate sales in Canada and four times as large as in Japan.

But U.S. companies must avoid complacency. U.S. companies established in Europe can benefit by the increased market openness. They should be able to compete for more government procurement business, to select banking and insurance services from the lowest cost supplier, face fewer border barriers, be better able to optimize production and distribution patterns. But they must face the competitive challenge by reexamining their business strategies and taking steps to make themselves more competitive.

U.S. exporters should find many benefits as well, and I anticipate our exports will grow as a result of 1992. Most American exporters to Europe have concentrated on selling to the three or four major countries in the EC, tending to overlook the other markets because they have not believed the results were worth the effort. EC1992 will lower the costs and difficulties of selling in the EC, and will make the European market attractive to a larger range of U.S. companies.

Additionally, American exporters should benefit from the fact that EC1992 will harmonize product safety standards and requirements -- individual EC countries will no longer maintain separate standards that require expensive product modifications. The harmonization of standards means that a U.S. company should be able to produce one product for the entire 320 million person EC market. This has resulted in a sharp rise in interest in exporting to the EC.

SCIENTIFIC AND TECHNICAL COOPERATION

Standardization in new technologies will require increased commitment to joint R&D efforts focused on compatibility and interoperability within the EC. Europeans have indicated that they are open to working closely with U.S. experts in these areas, and we hope that U.S. firms will have an opportunity to participate with their European counterparts in research to develop standardses. However, new emphasis on cooperative R&D in the EC will also challenge U.S. firms, particularly if the standards developed in Europe are not compatible with U.S. technologies.

While Europeans have been engaged in cooperative R&D programs for a number of years, 1992 has meant renewed enthusiasm for international cooperative research in Europe, with emphasis on providing the technology base that will enable European industry to become more competitive in world markets. Broad-based programs such as BRITE (Basic Research in Industrial Technology for Europe) and EUREKA (European Research Coordination Agency Program) are being given new direction as a result of 1992. Let me highlight some examples of these efforts.

The ESPRIT program (European Strategic Program for Research and development in Information Technologies) is the Community's major vehicle for assisting European industry to meet the competitive requirements of 1992. The second phase of this program was launched last year. Funding for R&D projects currently underway under ESPRIT totals nearly $2 billion. Specific projects focus on microelectronics, information processing systems, and information technology applications technologies. If this program is successful, it may create new competition for U.S. firms that traditionally have held a leadership position in information technology.

The Community has also established a program to promote the competitiveness of the EC telecommunications industry, operators and service providers. RACE (Research and Development in Advanced Communications Technology for Europe) is designed to ensure compatibility between the different telecommunications systems and services under development in Europe. While we are encouraged by the move toward a more competitive European telecommunications market, we are watching carefully the impact that this may have on U.S. firms attempting to compete in that market.

High-definition television (HDTV) is a near-term commercial product that is likely to benefit from the new impetus that the 1992 program has given to joint European R&D projects such as ESPRIT and RACE. HDTV has great promise for consumer markets, and may have industrial and military applications as well. Many industry and government observers here in the United States feel that HDTV offers both a window of opportunity for us to recover some of our comsumer electronics manufacturing base, and a challenge to the U.S. computer and semiconductor industries. The Europeans also see the opportunities, and are organizing themselves to develop HDTV technology based on a common European standard. The EC has established a consortium of major European electronics companies under the umbrella of the EUREKA program to focus on HDTV.

1992 will provide benefits for the continued integration of the EC in the area of energy R&D as well. There is already considerable collaboration among EC member states, in both nuclear and non-nuclear energy. The 1992 program is intended to remove trade barriers and bring about a more uniform pricing system. If integration of member state taxes and regulation in the energy sector is successful, we may see the EC move ahead in the development of energy-efficient technology. Since EC energy goals emphasize energy efficiency and nuclear reactor safety, a more concentrated R&D effort could increase the chances of a major European presence in energy demand and nuclear technology markets.

The 1992 program may also have an impact on R&D efforts in other high-technology industry sectors. The most important of these is semiconductor technology. Several EC nations are supporting JESSI (Joint European Submicron Silicon Initiative), a consortium of semiconductor chip manufacturers. JESSI was created specifically to challenge the Japanese effort in semiconductors and our SEMATECH program.

If the Commission decides to provide funding for the JESSI program (this is currently under consideration) we would hope that that participation in the program would be open to any company operating in Europe with R&D facilities there. This general rule has been applied in other EC R&D programs, such as ESPRIT, and some U.S. companies do participate in these programs.

We also hope that the 1992 program will not disrupt current multilateral and bilateral agreements that we have with the EC and member states in basic science and research. The EC-U.S. High Technology Work Group, established in 1983, provides us with a venue to raise with the EC any technology issues that may arise as a result of the 1992 program.

MARKET ACCESS

Now, Mr. Chairman, let me turn to the key question: What will happen to U.S. market access in EC1992? Will it improve? Or will we find that increasing openness within Europe leads to overt or subtle barriers that will lessen our access?

As many in the EC have argued, 1992 can only succeed if Europe does not increase external barriers. However, it must be remembered that there are many in Europe who have been accustomed to protection, and who are not enthusiastic that they will have to compete in more open markets. As inefficiencies are exposed in Europe, there will be losers as well as winners, and the losers can be expected to seek protection from their governments.

Mr. Chairman, 1992 lies both in the drafting of directives and in the implementation of those directives. Every day represents a new challenge for those in Europe who seek openness, and a constant struggle with those who do not. I do not envision a fortress Europe, nor do I believe that the forces for free trade will win every battle within Europe. We must expect more narrow interests to prevail in some cases, and must be assertive in protecting our interests.

I have significant concerns in a number of areas regarding 1992. Most important are the lack of sufficient openness, "transparency," in the EC's standards development process; and critical questions in whether or not testing and certification procedures will be operated in a way that does not disadvantage U.S. firms. Our concerns in the near term focus on standards devlopment, testing and certification in established industrial product areas, where there is a wide range of competing national systems. However, the process by which standards are developed for new technologies, such as information and communications technologies, will also be critical for U.S. firms.

Secretary Mosbacher will be travelling to Brussels at the end of this month, Mr. Chairman, to pursue many of these questions -- particularly in the standards and testing/certification areas.

STANDARDS AND TESTING/CERTIFICATION ISSUES

Let me turn to the area of standards and testing/certification, to explain our concerns. Of all the areas of concern to U.S. industry, this is the one raised most frequently.

The EC is moving to a system which replaces the 12 different national sets of technical requirements with one set of essential requirements applicable EC-wide. A company qualifying to market in one country will be guaranteed free access to the other eleven. This is good news, as is the fact that in many areas, the EC is willing to accept not only products meeting EC standards, but also those produced to different standards (including U.S. standards) if the manufacturer can demonstrate that the product meets the EC's "essential requirements."

Nevertheless, exporting throughout the EC is greatly facilitated by meeting the EC technical specifications, and it is important that EC standards be as compatible with U.S. standards as possible. But the process of developing the technical specifications in the EC is not an open and "transparent" one. The process does not allow participation of U.S. exporters in commenting on draft standards and working to ensure that there is minimal incompatibility between EC and US standards. On the other hand, the U.S. standards development process is generally open to EC firms.

Involvement by U.S. companies is necessary in order to minimize trade difficulties caused by standards. We would like to avoid problems, for example, such as appeared in the EC battery cable standard for forklift trucks, in which only European manufactured cables were able to conform to the standard. Another example is that the EC has mandated the use of a particular automobile emissions test employing a procedure the United States abandoned long ago in favor of a more sophisticated test. The application of the EC's new directive could require U.S. manufacturers to use two sets of tests -- one to satisfy U.S. regulations and one to satisfy EC requirements.

As I have said, Secretary Mosbacher has made it a priority to explore ways to develop with the EC an openness to standards-related matters for U.S. companies that will allow U.S. exporters equivalent access to these highly technical procedures as EC companies will enjoy. Commerce has been working with the American National Standards Institute (ANSI) and a wide range of U.S. standards and testing/certification bodies on this.

Open and non-discriminatory treatment of U.S. firms in the developing area of European testing and certification is also a vital aspect of access to European markets. Testing and certification procedures are the means of demonstrating conformance to standards. These procedures can either facilitate trade or can be very effective barriers. This will be a major aspect of Secretary Mosbacher's discussions in Brussels, Mr. Chairman. An open system can do much to allay the concerns of U.S. companies. A closed system, on the other hand -- one that would discriminate against U.S. companies by slowing their product approval or by making it more difficult or impossible to obtain certification -- would be one of the most serious trade barriers.

In this context, I need to stress that the United States as well needs to act to achieve greater compatibility. Not all the responsibility can be attributed to the EC. As the most obvious example, the United States must accelerate its conversion to the metric system. World trade is transacted principally in metric measures. Only the United States, Burma, and Liberia still are not committed officially to metric, although the 1988 Omnibus Trade Act has now declared metric as the preferred measurement system for U.S. trade and commerce.

CONCLUSION

Before concluding my remarks, Mr. Chairman, I would like to briefly summarize some potential issues that may arise with respect to 1992 and EC R&D programs. We have many questions about the long-term impact of the range of joint R&D programs sponsored at the EC level. While the vast majority of R&D funding remains at the member state level, the initiatives taken at the Community level provide a clear indication of the direction in which the Community as a whole intends to move to increase the technological sophistication and competitiveness of European firms.

Targeted areas include information and communications technologies, semiconductors and HDTV. All of these areas represent "greenfield" technologies - new-to-market or pre-commercial technologies where there is substantial room to shape future markets through the development of common standards. Firms that get in on the ground floor in research programs that focus on developing these technologies will have an edge in determining what types of products will emerge from the commercialization process, and how these products will interface with other system components.

U.S. firms are leaders in high technology areas. We do not want to see this lead disappear as a result of the process being undertaken in the EC to integrate European markets for these new technologies.

Mr. Chairman, in concluding my remarks let me restate that we are optimistic about EC1992. We have problems and concerns that we need to work out with the EC, but I assure you we are not sitting around expecting the worst to happen. Instead, we are working actively with our European partners to see that the best happens.

The dialogue with the EC needs to be continued and expanded. Part of the reason for the initially high level of concern in the United States was that we and the EC had not had a dialogue sufficient for us to understand their plans. We have increased the dialogue, but it needs to grow even more -- at all levels. This is the key to solving problems between the United States and the EC and to building an even stronger transatlantic partnership.

Thank you, Mr. Chairman.

The **Chairman**. I want to thank the distinguished Secretary for his response.

A couple of questions: The State Department seemed to be a little bit spongy yesterday, in the sense of exactly what was being done, in the sense of the advanced communications and discussions you are talking about today.

You mention in your statement, "Without reliable timing information, an open market can give the impression of a fortress. We want to make sure that U.S. business is prepared for the opportunities."

Some of the business people tell us that they are actually buying smaller firms in Europe. What do you see as the progress from your efforts with the 7,000 firms that you have contacted, and so forth?

Mr. **Shaw**. There is a good deal of public confusion about what is happening in Europe and, I have to say, a certain amount of misinformation and disinformation floating around about what the Europeans in fact are up to. One of the roles of the Department has been, over the last—certainly, over the last year, but within the course of the last few years—has been providing a nexus of information that is reliable about what is happening, particularly so far as commerce is concerned, what is happening in the promulgation of standards.

What we have been after, and what you may have seen the Secretary raising sizeable concerns within the media about, is that under the existing European standards process, both in general and in the electronic sector, the process has been put together in such a way that there is not even an American observer within the institution.

Our desire is to take the precedent which was set up within the European Communications Standards Institute, which does allow for an American observer, and at least have our views available as the standards are put together.

What this means in practice is that we want more transparency, as the rules are being put together, to have a sense of what the process actually is, what the rules are, so that we can at least get American industry on the train.

The discussions that the Secretary has had, both with the heads of the European Standards Institute on the one hand, and with a number of senior people, since his first commentary on this, have made it clear that we are not trying to bull our way into the china shop, but to really ensure, as in so many other things, that we have a fair shake and that these are not set up as arbitrary, and under GATT illegal, non-tariff barriers that we then will have to jump over later on.

So the answer is, generally, that we are providing at Commerce a nexus of as complete information as we can on the emerging standards. In the sort of pre-negotiating stage—the negotiating side is obviously Ambassador Hills, and not the Secretary—it is an attempt to cajole, pressure, what- have-you, the Europeans into a set of standards which we can comfortably live with.

I should say in that respect that what I am addressing myself to is the lower end of the spectrum, our concerns. There are a lot of positive indications. The best one I can give you is that the rules, as they have been set up, allow for self-certification to European standards; so that if Americans in a given sector, for example, are producing to the European standards, all they have to do is to declare that, and in a good many instances they can go forward.

What we are concerned about is anything that would be quietly put together and then announced arbitrarily in a way that could limit us down the line.

The CHAIRMAN. Questions? Mr. Browder from Alabama?

Mr. BROWDER. Thank you, Mr. Chairman.

What I would like to ask is a pretty simple question. You assure us that you are not sitting around expecting the worse to happen, that you are trying to provide a nexus of information. What is currently being done, beyond just providing a nexus of information, to coordinate efforts among the different branches of the Federal Government, to make sure that the U.S. Government has a single coherent policy in addressing those EC 1992 directives which may affect us? You said you are not just sitting around.

Mr. SHAW. Well, the process, the entire United States trade posture—it is one of the things I am sure you are responding to—over the past 10 or 15 years has been plagued by multiple centers of interests and activities; so that, as Secretary Mosbacher pointed out, the Japanese for example, if they did not get an answer in one place that they liked, could go further down the street and get another one.

I think what we are seeing now, if not for the first time, certainly in a coordinated way for the first time, is a structure, and basically it is centered in the Economic Policy Council, with appropriate Cabinet members and the President. There has been one EPC meeting already on EC 92.

Below that, the Trade Policy Coordination Group, under Ambassador Hills, basically breaks down into component parts which include some commerce, directed subcommittees on standards, and a cross-section of other things.

What has happened is that, for the first time, I think three things have come together: One, we have a Secretary of State with a longstanding interest in these economic matters; secondly, we have a Secretary of Commerce with really quite direct access to the President; and thirdly, probably the most able negotiator we have had in the USTR arena for quite a while—all playing off the same sheet music.

So all I think I can produce in the end is whether the results come out of this. But certainly, for the first time that I have observed for quite a while, we have a parallelism; if not an absence of turf battles at least a recognition that we are all pointing in the same direction and ought to be avoiding that at all costs.

Mr. BROWDER. Let me follow that up for just a minute, Mr. Chairman.

Do you see any structural changes that need to be made, or do you think that it is just all pointing in the same direction and that it will accomplish what we are interested in?

Mr. SHAW. I am loathe to tinker with the wiring. I think we can all put together wiring diagrams that look better than the one we had last year. My tendency, and I think the desire of the Administration, is basically to make what we have, which has most of the component parts that we need in it, to make it work better. And it certainly is working better than I have seen it in the past.

In short, I do not think, apart from sort of abstract reasoning, that we need any new structure in this thing.

Mr. **Browder**. Thank you, Mr. Chairman.

The **Chairman**. The Chair recognizes the distinguished gentlelady from Rhode Island.

Ms. **Schneider**. My apologies, Mr. Shaw. I had to step out of the room a moment. Has anybody asked you about coordinated efforts among the various agencies? Is there a coordinated central effort to communicate on the exchanges being made for 1992?

Mr. **Shaw**. I just finished saying that it is coordinated basically through the Economic Policy Council at the top of the Government. The point I would make that I did not in the last response is that Commerce acts pretty much as the hub of the informational requirements in this process; that we have, compared to anywhere else in the Government, a relatively large group of people that are focused strictly on EC 92.

Obviously, our interests are the long term, and the commercial interests to the United States. That coordinated process is working, by my reading right now, fairly well.

Ms. **Schneider**. What kind of bilateral or multilateral scientific agreements do we have at this time with the EC nations?

Mr. **Shaw**. I have a list of them here. But in terms of a general answer, we have existing ones both with the UK, with Germany, and with France, some of which go back to early NATO agreements and which are ongoing, and probably will be, if anything, enhanced by the EC 92.

Ms. **Schneider**. Will they have to be renegotiated after this?

Mr. **Shaw**. There is some concern that they might well be made a lot more explicit, but it would depend sector-by- sector. Once again, it would depend on what kind of standards were established in Europe. The problem does not exist as yet, and it would have to be handled on a case-by- case basis.

Ms. **Schneider**. I am concerned that we be able to prevent, to whatever degree possible, any kind of detrimental arrangements. And so, however we can anticipate what directions those might move in, I think it would be so much the better.

I would appreciate, since you have the list with you, if you might be willing to share that with me, because it is an area that I am very much interested in, in terms of specific scientific agreements. I would like to find out what generic areas they fall into and what countries are particularly involved.

Mr. **Shaw**. I will have to provide that after the hearing, if I may.

The **Chairman**. If the gentlelady would yield, if you would supply a copy for the record, as well.

[Information to be provided follows:]

UNITED STATES DEPARTMENT OF COMMERCE
The Associate Deputy Secretary
Washington, D.C. 20230

Honorable Robert A. Roe
Chairman, Committee
on Science, Space, and Technology
House of Representatives
Washington, D.C. 20515

Dear Mr. Chairman:

During the question and answer period following my testimony before the House Science, Space, and Technology Committee on May 17, I indicated that I would provide the Committee with a listing of U.S.-European Community (EC) scientific and technical agreements to be included in the official record of the hearing.

Enclosed is a list of U.S.-EC cooperative agreements in science and technology at the EC level. As you can see, some of the agreements have expired and are under consideration for renewal. I think that this listing offers useful information as to the current status of EC-U.S. cooperation in science and technology.

I appreciate the Committee's interest in the science and technology issues associated with the EC's 1992 program. As I indicated in my testimony, we are working with our European partners on a broad range of issues to ensure that the EC's Single Internal Market is an open one.

Sincerely,

John A. Shaw

Enclosure

AGREEMENTS CONCERNING EC/U.S. COOPERATION IN SCIENCE AND TECHNOLOGY

1. Agreement for Cooperation between the Government of the United States of America and the European Atomic Energy Community concerning Peaceful Uses of Atomic Energy.

Signed: November 8, 1958

Addition agreement:
Signed: June 11, 1960
Expires: December 31, 1995

2. Agreement for Exchange of Information concerning a cooperative program in the field of Management of Radioactive Wastes between the United States Department of Energy and the European Atomic Energy Community

Signed: October 6, 1982 for 5 years
Renewed: 1987
Expires: 1991

3. Arrangement between the United States Nuclear Regulatory Commission and the European Atomic Energy Community in the field of Nuclear Safety Research (replaces earlier Agreement on Nuclear Safety Research signed March 19, 1979 which expired March 18, 1984).

Signed: September 20, 1984
Expires: Spetember 19, 1989

4. Agreement between the United States Department of Energy and the European Atomic Energy Community concerning Cooperation on Safeguards Research and Development

Signed: January 28, 1982
Expired: January 27, 1987
Renewal: In preparation

5. Exchange of Letters on Cooperation between the United States Department of Energy and the Commission of the European Communities concerning Information Exchange on Research and Development in the field of Renewable Energy Sources

Signed: December 17, 1982
Expires: Indefinite

6. Memorandum of Understanding between the United States Department of Energy and the European Atomic Energy Community concerning Research on Health and Environmental Effects of Radiation

Signed: July 7, 1986
Expires: July 6, 1991

7. Exchange of Letters between the United States (Special Assistant to the Secretary of State for Environmental Affairs) and the Commission of the European Communities concerning Cooperation in Environmental Matters

Signed: July 1, 1974
Expires: Indefinite

8. Memorandum of Understanding between the United States Bureau of Mines, Department of the Interior and the Commission of the European Communities concerning Sharing of Information in the Field of Mineral Technology

Signed: January 16, 1984
Expired: January 15, 1989
Extension: in preparation

9. Agreement between the U.S. Department of Energy and the European Atomic Energy Community in the field of controlled thermonuclear fusion

Signed: December 15, 1986
Expires: December 15, 1996

10. Memorandum of Understanding between the U.S. Environmental Protection Agency and the Commission of the European Communities concerning cooperation in the field of environmental research.

In preparation

Ms. **Schneider**. Thank you very much. My time is up.

The **Chairman**. The Chair recognizes the distinguished gentleman from California, Mr. Brown.

Mr. **Brown**. Mr. Secretary, this committee has a longstanding interest in the metric standard situation, which you referred to in your statement. I would like to just ask this question. Can we use EC 92 to get a little more leverage to speed up the conversion of metric in this country?

Mr. **Shaw**. I am not sure if that is in the hands of any governmental figure. It seems to have its choke point in the citizenry, who still like miles and pounds. I suspect that we will have a certain amount of pressure. Just as the British have had an internal reticence on the part of the electorate to happily use that, we will have that continuing here.

I think there will be pressure from Europe to do it, and certainly on the standard side of things, in a straightforward way.

Mr. **Brown**. That actually is very important, if the Europeans would insist upon the use of metric standards for marketing within the Common Market. The American citizens, I think, who face a choice between having a job or using feet and pounds, might prefer the jobs.

Mr. **Shaw**. I hear you 100 percent.

Mr. **Brown**. And switch to metric.

You made some reference to the increase in mergers taking place within the Common Market as a result of EC 92. Obviously, that is aimed at developing economic units that are more competitive.

The question that comes to my mind is: Is this happening within individual countries? Or, is some of this merger taking place across national boundaries, which would then be more parallel to the U.S. posture in Europe?

Mr. **Shaw**. It is happening in both ways, Congressman. We have seen the same phenomenon, as you are well aware, with European and other international firms coming in and merging with American firms. It is a phenomenon which I think is both anticipatory of EC 92 and part of a wider process which is not really European focused at this stage of the game. But certainly, for reasons of efficiency, I can think of—for example, within the telecommunications area, the Thompson expansion into Italy, there has been a whole cross-section of German-French movements.

I think we will see, as this market becomes truly an open one, a good deal of that as part of the process.

Mr. **Brown**. One additional question, if I have the time, Mr. Chairman. Obviously, the European Community is looking toward becoming much more efficient as an economic block as a result of this. Part of the fall-out from that is going to be that they are going to be increasingly competitive in seeking markets outside the block.

I am looking particularly at Eastern Europe and the Soviet Union, which really is a very large, relatively untapped potential because of the growth curve that they have to go through. Are we going to lose out to the Europeans as a result of their complementarity to the Eastern Bloc?

Mr. **Shaw**. There is no question that there are several problems built into that. For the moment—and I guess the follow-up comment I would make is that there is no question that the Western European, the NATO countries, have always felt a kinship in the sense of their being lucrative potential markets there.

The question of whether we will lose out really is more a function of how much we are in it, and how much we allow ourselves to be in it, because of export controls and what- have-you.

So that part of the answer to your question I think has to come out of a crystal ball, because until we see what the effects of the ongoing changes within the Soviet Union are vis-a-vis the economies, for example, of Eastern Europe, we are not going to be able to be quite sure what the opportunity is going to be. I would think that we would respond to those as they arose.

The second part of it is, even now the question is not so much what are the opportunities, but how you get paid, and where the hard currency is going to come from. There are lots of barriers to that happening overnight. The question is how much the Europeans want to get market share in given areas, with promissory notes and not so good—

Mr. BROWN. I can see a picture down the road in which the Europeans begin to pre-empt the Eastern Bloc market, the Japanese begin to pre-empt a lot of the Asian market, particularly the Chinese market, and we are going to get more and more closed out of the total global trade. Of course, our strategy ought to be to develop the western hemisphere market, which of course has a lot of problems because of the debt situation and so on.

Mr. SHAW. My suspicion, Congressman, on the basis of data that I have seen, is that most of the firms that are either involved right now in the international trade arena or are trying to get into it would not like to limit themselves geographically the way you are suggesting. But think that they can compete really fairly effectively in Europe, and are trying to through good intelligence on what is happening and through positioning themselves to set themselves up so that they can indeed do that.

Mr. BROWN. Our fear is that they cannot even compete in the U.S. with some of these foreign marketers. So they are certainly not going to be able to compete in markets where there is a natural advantage to those European and Japanese competitors.

Mr. SHAW. The thing I would say—so far as EC 92 is concerned, and particularly all of the R&D efforts that I refer to in my larger statement—is that the Europeans saw themselves as one-down to both us and the Japanese, that a lot of this effort is an attempt to rectify that situation, and that we already have on the ground in Europe a very large American presence, for example in the computer area.

We are competitors right now. My own feeling is, if we keep the field glasses on the horizon on a constant basis, there is nothing that is going to happen out of Europe that we will not be able to address as it becomes a problem.

The CHAIRMAN. The Chair recognizes the distinguished gentleman from Pennsylvania, Mr. Ritter.

Mr. RITTER. Thank you, Mr. Chairman, and I thank you for your testimony, Secretary Shaw.

You mentioned computers. We can also toss in semiconductors there. The United States has significant market share in both of these areas presently in Europe. What do you make of the redefinition of the semiconductor product from that which has been assembled in the essentially finely-produced and crafted in Europe versus the fusion stage, which is the guts of how you make this thing?

What do you see in going from that sort of assembly definition to a fusion definition, in terms of American market share in Europe, which I believe is on the order of 45 or so percent, remarkably different from our market share in Japan, which has hovered around 8 to 10 percent in the beginning to today?

Mr. SHAW. That is correct. I guess my main response to that is that we clearly are opposed to that change. We will be revisiting it, because it falls exactly into the area that I was talking about, about the kind of standards and definition making that will create problems for us.

Mr. RITTER. In the domestic content rules that go into effect, could that essentially slice massive chunks out of America's semiconductor market share?

Mr. SHAW. It depends again on how you define America's market share. Some of the manufacturers, as you might expect, are setting up in anticipation of that, not being able to be amended in a variety of ways—are setting up their own manufacturing plants in Europe.

The Japanese, I should say, as the horizon-level problem, are investing very heavily in plants of their own in Europe for the very same reason.

What I would hope to be able to have happen is some set of negotiations that would redefine that in a milder way, that was akin to what we were able to work out on questions of country of origin and percentage content in the U.S.- Canada Free Trade Agreement.

Mr. RITTER. The idea, by the way, of this regulatory approach stimulating the transfer of American production capacity over to Europe, and that means the loss of American jobs—and then also, Japan coming in there in the same light. We are all very familiar with the way Japan works its semiconductor production and trade policy.

Boy oh boy, I tell you what: It is the last great bastion for American semiconductors is under serious assault.

Mr. SHAW. I should say that in the whole field of telecommunications there are a number of issues, and that is one of them, that are going to be coming up within the Uruguay Round, under the GATT. I am confident that Ambassador Hills will be taking on that, along with a number of other issues.

Mr. RITTER. My other question is on high-definition television. The Europeans have coordinated themselves to address a European version of high-definition television. They have the project "EUREKA." They have been coordinated and with a little more foresighted than us.

These kinds of products, end-use markets, in the words of Dick Elkis, are sinks for highly sophisticated electronic componentry, such as semiconductors. I think we have to be on the look-out, if they are going to be producing this stuff. We have to really be on the look-out that we have entry into that market for those kinds of products.

So, are we?

Mr. SHAW. You are no doubt aware of the profile that Secretary Mosbacher has taken on the whole question of the HDTV and the future of the American electronics industry as a result of that. His sense is that this is the drive-train for virtually everything in the electronics industry; that this is not just a sort of "yuppie" television set that would be nicer to have, give you clearer football games on Sunday afternoon, but rather one, a series of technologies which basically will, in the '90s and beyond, be the basis of whatever electronic industry remains here if we were not to go forward with it.

As you may or may not be aware, the head of the German PTT was here yesterday. He spoke with the Secretary, and made a speech where basically he advocated joining together the European efforts in that arena with whatever we might be doing in the United States.

I believe the Secretary's view of that is that it is certainly one option among many others that have to be looked at.

Mr. RITTER. Are we going to look at that very carefully?

Mr. SHAW. We certainly will be looking at it, as one of many options that we have to deal with. Because the thing that you are probably aware of is that both the Japanese and the Europeans, each in their own way, are well advanced beyond what we are doing in that field. And whether the answer to either of the standards that they have established is to somehow adapt them, or to develop one of our own with some kind of consortium along the lines of the original RCA consortium, remains to be seen.

But we are at the early stages of it, and I think the Secretary has made very clear what the limits are of what he views government policy ought to be on that. And we are certainly concerned about it, and we will certainly be addressing it as a priority.

Mr. RITTER. Just a closing comment. It is ironic that the inventors of the television, in the United States, the inventors of color television, in the United States, the country that has the most significant dispersal of television availability, in the United States, is at least a decade-and-a-half behind the Japanese and probably eight to ten years behind the Europeans.

Thank you, Mr. Chairman.

The CHAIRMAN. The Chair recognizes the distinguished gentleman from Louisiana, Mr. Hayes.

Mr. HAYES. I really want to follow up a bit with some of the questions that Mr. Brown had. But it is interesting to me to first observe the difference between the Japanese view of 1992 and the American view of 1992.

The Japanese Government, their commerce department and their industry, are pretty homogenous in their views. They take the statement that you made earlier, that the efforts in 1992 were spawned by a desire to become more competitive, since both the Japanese and the American marketplace are ones in which they do not feel that they are up to the test on global competition. Therefore they move rapidly with investment prior to cut-off dates of 1992.

In this country, we have major sectors of industry looking at Portugal, looking at Northern Ireland, looking at Spain, trying to beat cut-off dates. And we have a government that is making statements like, "Maybe in 1992, it is going to enhance us all."

So my question to you is, are the Japanese business and government, are they more correct in the coordinated view? Or, should we be more served by splintering, where we have a Commerce Department that is hesitant to jump in and say, "We've got a problem, we should be there earlier," and advising businesses to do so; or one that says, "This could be opportunities for markets"?

Mr. **Shaw**. It seems to me that we have got to—I do not accept the characterization that somehow we are behind the curve in this. It seems to me that there is a wide cross-section of American companies who, after all, are the ones who are making that decision.

The way our business-government relationship is set up, as you are well aware, is not one where we are coordinating an industrial policy. The times that we have gotten into that game—Synfuels Corporation being the one that comes to mind more than any other—it has not been the wisest of decisions.

My sense is, we are giving counsel where we can, to the extent of our information and wisdom in that. But it is the companies, it is the manufacturing operations themselves, who ought to be hopefully a bit wiser than any of us would- be gurus at the Commerce department or USTR or at State, who ought to be making those decisions.

Mr. **Hayes**. That is precisely the point I am making. And the decision is not critical of the Commerce Department. There is no one in Congress who has more respect for Bob Mosbacher than do I.

The point I am making is, because of what you just said, our government relationship with business, as contrasted to the Japanese Government relationship with business, makes it more possible, in my opinion, to deal with the aftermath of 1992.

What I am suggesting is that we ought to consider a framework within our own structural relationship, which is quite distinct, well in advance of 1992, because the natural Japanese alliance will make reaction to a market condition, whether it is technical standards, public procurement rules, whatever. They will be able to react faster. So we had better call our shots earlier and coordinate on a much earlier timeline, because we do not have that capacity and easy access in and out.

Mr. **Shaw**. I would agree 100 percent, and I would argue also that the coordination is ongoing. It might not be moving quite as smoothly and marvelously as we all would like, but it is moving pretty well at this stage of the game, compared to some times in the past.

I guess my only other comment on that is that a lot of the European reorganization, redefinition, what-have-you—are aimed not so much at us, as at the Japanese. The concerns that you raise are, I would argue, as nothing compared to the amount of wind that is being sucked in by our Japanese friends over this process.

So it is not as though we are slipping further and further behind. I am, frankly, guardedly optimistic that the process that we are in now may once again, in a whole lot of areas that we are concerned about, produce a more competitive series of American industries world-wide; but that has not happened quite yet.

Mr. Hayes. I would also be interested in knowing if Commerce, in looking at the model toward 1992, is making the assumption that some of the ridges that still need to be cross are crossed? Is there an economic model in 1992 that shows energy consumption, use, and what as an entity would be the most likely future source of energy for the region?

Mr. Shaw. There is. I saw just yesterday—I do not think I have it with me—ones which provided that some of those projections, obviously, have got a much greater dependence than we have established on atomic power, number one.

Number two, they are obviously directly dependent on Middle Eastern oil fields, but the exact numbers I do not have here.

Mr. Hayes. The specific reason I mention that, you just stated half of it: they have much greater, statistical at least, dependence upon nuclear energy, giving them an opportunity and a larger segment of that economy to try to move away from a dependence on OPEC, leading me to the proximity in the northeast to the huge rush on petroleum and gas reserves.

This therefore dovetails back to an earlier question on the potential relationships with Eastern Europe and the Soviets for both pipeline construction and a natural marketplace for perhaps an alternative and maybe in their view secondary or primary source of petroleum products while energy conversion takes place across the network in 1992, making their equivalent of a synthetic fuels corporation both for alternative energy supplies and for preservation of existing supplies more possible within an integrated 1992 than it has ever been possible for Western Europe to do.

Mr. Shaw. I agree with you that there are potential conglomerations coming on, that we have not looked at as fully as we might have; but I think we are getting ahead of the curve.

Mr. Hayes. My point is, we had better be, because we have been behind it long enough. Please tell Mr. Mosbacher "hello" for me. He happens to be a good friend of my family, and nothing I have said—we may cross swords on occasion, but I have an extremely high regard for the Secretary.

Mr. Shaw. Very good.

The Chairman. The Chair recognizes the distinguished gentleman from North Carolina, Mr. Price.

Mr. Price. Thank you, Mr. Chairman.

The Chairman. Can the gentlemen suspend? Can you wait just a moment?

The Chair recognizes the gentleman from Missouri, Mr. Buechner.

Mr. Buechner. And I thank the gentleman from North Carolina, and you Mr. Chairman.

In the discussion about HDTV, we inevitably end up with people soliciting support from the United States as "United States companies." Normally excluded from that group of United States companies is Phillips of North America, which I think is the largest manufacturer of television in the United States right now, if I am not mistaken. If they are not first, they are second.

They have, from my understanding, spent millions of dollars of their own money in research in HDTV. They are always spoken of as a European company, which they are. I think they are a Dutch company. Is that correct?

Mr. **Shaw**. Yes.

Mr. **Buechner**. What I am wondering is, if we decide as a nation to support publicly the private consortium, should we be excluding from that Phillips of North America, which would bring to the party a lot more basic research ~~in this ar~~ea than any of the United States companies that already want to do it? Or, would we risk the danger of technology flow-back into the European consortium?

Mr. **Shaw**. It would seem to me that that question is clearly something that is going to have to be addressed as the consortium is put together, if there is indeed to be a consortium to move that problem forward.

It seems to me that it runs up against some of the same kinds of problems that were raised a few weeks back, if you will remember, when the American subsidiary of Sony wanted to bid for some research money out of DARPA at Defense. Was that an American company, or was it something else? We were really getting into deep water, and we are starting to open up an area that we really did not want to get into.

It seems to me, conceptually, that is going to have to be addressed as part of the problem when the rubber hits the road on HDTV.

Mr. **Buechner**. Obviously, there has been no Cabinet- level decision on this.

Mr. **Shaw**. That is correct.

Mr. **Buechner**. These are always tough ones, but do you have any personal feelings about what is the best economic road? And I am not talking about the technology, but the best economic road for the United States to follow on this?

Mr. **Shaw**. If you keep in mind that the role of the United States Government in all of this, and certainly the Commerce Department, is basically one of trying to challenge American industry and to provide a series of conditions for American industry, however defined, with or without the Phillips people, to address this problem so that they can come up with some solid economic, financially viable answers for themselves—then it seems to me that it would be premature, from my musings on this.

I have worked very little against the kinds of calculations that any of them would make. If the indications last week of all of the great entrepreneurial types that I think were testifying before various Congressional committees, or at least making their views known, whereby they consider that they could do it indeed with two different dollops of half-a-billion dollars up front and a mere billion dollars in loan guarantees—I would suggest that that is the route—there would be a good deal of reticence on the part of the United States Government to be the sponsor of all of that.

Mr. **Buechner**. I was just informed by our ever-vigilant staff that the applications of Sony were accepted.

I really have to go, but I just wanted to kind of get your reasoning on this, because it really does bother me, as I look at the dollar signs, which have gone up substantially over the last year when we talked to the applicant companies about—or the ones that were being thrown into the potential pool. Besides all of the other changes that we make in antitrust laws, when we get down to the raw dollars that they want in terms of guarantees and grants, the number keeps rising.

I understand that; prices keep going up. But it seems to me that they are going up in a more geometric pattern than they are in real just cost of living increases. And I guess I wonder, then, as you do, what is a United States company? What isn't a United States company? I guess we are going to have to ferret that out here.

I thank you very much, Mr. Shaw.

Mr. SHAW. Thank you.

The CHAIRMAN. The Chair recognizes the gentleman from North Carolina.

Mr. PRICE. Thank you, Mr. Chairman.

Mr. Shaw, I would like to return you to the question of standards and testing, on which you rightly focus in your statement as a major matter of concern. You say, on page 15, " . . . the process of developing the technical specifications in the EC is not an open and 'transparent' one. The process does not allow participation of U.S. exporters in commenting on draft standards and working to ensure that there is minimal incompatibility between EC and U.S. standards. And on the other hand, the U.S. standards development process is generally open to EC firms." I wonder, first of all, if you could comment further on this asymmetry between EC and U.S. practice, and then also help us understand a little further how the European standards- setting process works.

As I understand it, there are two European organizations setting standards: The Committee for European Standardization, and the Committee for European Electrotechnical Standardization. How do U.S. companies and industries get their voices heard on these two committees?

What framework is there for formally presenting U.S. standards positions? And what can the U.S. Government do to help American companies have greater input into EC standards development?

You note in your statement that this is a high priority for Secretary Mosbacher, but your wording, I think you would agree, can be more precise. You say, he ". . . has made it a priority to explore ways to develop with the EC an openness to standard-related matters for U.S. companies."

I wonder if you could be a bit more concrete as to what our strategy comprises?

Mr. SHAW. I was not trying to be—to write weaselwords on that, Congressman. What I was trying to do is to indicate that the principal responsibility, if it comes to negotiating that, falls with Ambassador Hills, and not with the Secretary. His role heretofore has been one of a very forceful cheerleader, to encourage the Europeans to move in what we consider the right direction on that.

And to date, he has found a certain receptivity, particularly as he indicated to him that his object was not to force his way in with his chair, but to just make sure that the process was a transparent one, and that we were not subjected to a kind of star chamber establishment of standards.

To get back to the beginning part of your question, most of the standard establishment of this country, as you might expect, is set up through the private sector. The testing is done largely through the private sector. The American National Standards Institute in New York is the focal point of all of this. The old Bureau of Standards, now NIST, plays a role in all of this.

But the effect of that is to provide relatively easy access to our standards, or to determining standards here on the part of Europeans. There are arrangements, for example, between Underwriters Laboratories, which does about 80 percent of the testing in this country, and various comparable private entities and European government entities, to provide comparability in Europe.

Mr. PRICE. What is the case with NIST?

Mr. SHAW. NST is basically a repository and a check point. The main focal point, of American standards-setting in industry is in New York, at the American National Standards Institute. But on the European side, when you say, "get access to SNDILAC," what we hope to do is to take the model which was established—on the telecommunications standards, the institute in Europe which does a lot for American observers—and have that status, or something akin to it, instituted. If not that, at least to provide for an openness of process, so that we know what the steps are, so that we know if there are problems with it, what kinds of rejoinder can be made; so that, in short, these standards are not written in such a way as to exclude American products, or what-have-you.

The point I would make, that I think is a helpful one for us, is that the 12 had been fighting among themselves for quite a while on this very question. And it has gone back and forth, so that ultimately what was established was a national standard, if a standard was established, in one country, as viable and valid. It would then be accepted by the others. There could not be what they called a sort of recipe blockage to this. If they did something slightly differently, the other Europeans could not get into their part of the market.

The people with the greatest responsibility in Europe seem to be more positively inclined than devious about all of this.

Mr. PRICE. My time has expired.

The CHAIRMAN. The Chair recognizes the distinguished representative from Missouri, Mr. Volkmer.

Mr. VOLKMER. I am sorry I was not here. I read most of your testimony, but I have not participated in all of the questioning.

Every time we, in this country, attempt to do something as far as trade is concerned, we hear from the Administration that that is building up walls and that we are going to destroy trade, and protectionism, and words like that. But yet, Europe is doing it, Japan is doing those things. They do not seem to be concerned.

Just on the standards, Europe does not seem to be disturbed on what we do and what we do not do. Do you want to comment on that?

Mr. SHAW. I will certainly comment on it, because most of my testimony this morning I think has been focused on ensuring that we prevent, insofar as it is possible, barriers being set up as part of EC 92.

So far as whether the Europeans are concerned about what we are doing here, or the Japanese, my sense is that they are vitally concerned that the market remain as open as it is here. And the Administration's concern, and certainly Secretary Mosbacher's, as he has voiced it on a number of occasions, is to ensure that the rest of the world is as open a market as we have here. That is what our efforts are toward.

Mr. VOLKMER. I would like to see what we do in the event that it is not. But right now, I would like to get on.

You mentioned, on page 6 of your testimony, a brief statement about European merging, and the increased amounts of capital equipment. Will we see more mergers after 1992, than prior to 1992?

Mr. SHAW. I did address that earlier. The answer is, yes, it is both part of the 1992 process, and something that we are seeing on a world-wide basis, irrespective of whether that was occurring.

Mr. VOLKMER. And that leads, of course, probably to stronger competition.

Mr. SHAW. I would hope so.

Mr. VOLKMER. In the areas where you mention the research, and getting together, like EUREKA and ESPRIT, RACE, and all of those, at least to me those appear more to be for applied technology. Is that correct, or incorrect?

Mr. SHAW. It is both. The funding over most of those programs was spread in a variety of ways, really relatively thinly at this stage of the game. I do not think there are any generalizations we can make, A, about its effectiveness, or B, what its effect will be in any given industry down the line, set against the activities of the individual European countries in supporting R&D exercise.

It is late in the game. It is an attempt, as I indicated at the beginning of my testimony, to play catch-up ball, because they see themselves as well behind both the United States and Japan.

Mr. VOLKMER. Basically, trying to get immediate applications and bringing up to date telecommunications and other areas.

Mr. SHAW. And I think it is both basic and applied research, Congressman, that has been funded under the various EC organizations. There are both.

Mr. VOLKMER. What I am getting at, while we are dropping back in our applied research—as far as funding by the government, we are cutting way back on it—they are increasing theirs.

Mr. SHAW. Everything is relative. Far and away, the bulk of the applied research in this country is being done by the private sector, as I would hope.

Mr. VOLKMER. It is being done, the bulk of it right now, because we are doing very little on the government end.

Mr. SHAW. Well, if you look at the various European activities—the graphs that were put together for my hearing today—one of the things that is striking is how relatively small, set against the European effort, the pan- European effort, the United States Government activity is in this.

On the other hand, in terms of our overall position, I would argue, we are remarkably strong in the given areas. The government activity has amplified appropriately what the private sector is doing.

But what the exact point is, whether throwing more money in a given area or another will do, I am not in a good position to predict. I hark back, as I did earlier, to the Synfuels Corporation. I remember it well. The prediction was that shale oil would be competitive when we got to $13 a barrel. By the time we had hit $42 a barrel, it still was not competitive. So I am not sure that we have great wisdom in predicting things within the commercial area.

Mr. VOLKMER. Mr. Chairman, if I may.

It is your opinion that we do not need any additional funding in applied research?

Mr. SHAW. My sense on that is that it ought to be addressed on a case-by-case basis. We certainly need more applied research, but what the role of the U.S. Government is I think in a general way ought to be the sum of the individual cases; not, at this stage any way, the desires for some sort of Manhattan Project, to make us more competitive.

Unfortunately, we are not and cannot set up a United States Incorporated, like MITI, to try to deal with this. It seems to me that becoming acutely aware of the problems, and trying to address them in a coherent way without prejudging it before we get that assessment and that team together, would be unfortunate.

Mr. VOLKMER. I personally believe that, in working with business and industry and their research efforts, the Government could provide incentives in certain areas, in order to move ahead faster in certain areas of technology. And I think there is a place for Government in that area.

Mr. SHAW. I agree 100 percent. I guess the only comment I would add to that is that, if you look back almost 20 years ago now to the whole question of the SST project, the supersonic transport, which was basically decided to be too big, too narrow, what-have-you, for the Government to get involved in, that the whole series of experiences that that allowed the Europeans to move ahead with helped to create the air bus industry.

So either way, on the positive or the negative side, we have got examples of ways in which, when we did or did not move in, there were adverse effects.

Mr. VOLKMER. Thank you, Mr. Chairman.

The CHAIRMAN. Mr. Secretary, I want to thank you very much for your testimony. We appreciate your being with us this morning. It has been very productive, and we appreciate your help.

Mr. SHAW. Thank you, Mr. Chairman.

The CHAIRMAN. The Chair would recognize our next witnesses, Dr. John H. Moore, Deputy Director of the National Science Foundation, and Dr. Richard Bradshaw, international analyst.

Dr. Moore, are you ready?

[The biographical sketch of Dr. Moore and Dr. Bradshaw follow:]

NATIONAL SCIENCE FOUNDATION
WASHINGTON D C 20550

JOHN H. MOORE
Deputy Director
National Science Foundation

Dr. John H. Moore was appointed Duputy Director of the National Science Foundation by President Reagan on May 16, 1985.

Dr. Moore is on leave of absence from the Hoover Institution at Stanford University where he was Associate Director and Senior Fellow of the Institution. Before going to Hoover in 1981, he was an economics professor and associate director of the Law and Economics Center at Emory University. Prior to going to Emory he was a research professor and associate director at the University of Miami's Law and Economics Center from 1977 to 1980.

Dr. Moore served as a research chemist for the Procter and Gamble Company from 1959 to 1963. He was a graduate student from 1963 to 1966 at the University of Virginia and worked as a research teaching assistant during that period. He taught economics at the University of Virginia from 1966 to 1977.

Dr. Moore earned a bachelor of science degree in chemical engineering in 1958 at the Unviversity of Michigan. The following year he earned a master of business administration degree at the same institution. He was awarded a Ph.D. degree in economics by the University of Virginia in 1966 and was assistant chairman of that university's Department of Economics from 1968 to 1972. He was president of the Thomas Jefferson Center Foundation from 1972 to 1977 and is currently a member of its board of directors.

Dr. Moore was born April 19, 1935, in Grand Forks, North Dakota. He is married and has two children.

February 1987

BIOGRAPHICAL SKETCH

Richard E. Bradshaw
National Science Foundation

Richard E. Bradshaw serves as International Analyst in the Division of International Programs at NSF. His specific duties encompass research and assessment of foreign science and technology policies, programs and resources, with a principal concentration on Western Europe and the European Community.

Mr. Bradshaw has been at NSF since early 1988, on extended leave from George Mason University, where he holds the position of Assistant Research Professor in the Office of the Provost. While at GMU, he established the International Technology Exchange Program, and he was the principal architect of an innovative, multidisciplinary graduate program in International Transactions which will be implemented for 1989-90.

Prior to his work at GMU, Mr. Bradshaw provided consulting to foreign governments and corporations for five years in the field of R&D organization and management in the United States. Before setting up his own business, he had established a foreign technology assessment function for a major U.S. trade association. Previously he had served as a U.S. Foreign Service Officer in Europe and Washington.

Prof. Bradshaw did his undergraduate work at the University of North Carolina in political science. He pursued graduate studies at East Carolina University in international affairs, where he took a Master's degree with honors, and at the University of South Carolina, where his doctoral study was in the field of comparative national security policies.

STATEMENT OF DR. JOHN H. MOORE DEPUTY DIRECTOR, NATIONAL SCIENCE FOUNDATION, AND DR. RICHARD E. BRADSHAW, INTERNATIONAL ANALYST, NATIONAL SCIENCE FOUNDATION, WASHINGTON, D.C.

Dr. MOORE. Thank you, Mr. Chairman.

I have a prepared statement that I would like to submit for the record.

The CHAIRMAN. The statement will appear in full in the record, without objection.

Dr. MOORE. I would like to provide a few summary remarks. To begin with, on the research programs that are funded by the Commission, and some of the major issues that the EC S&T programs raise for us, and on the broader policy context for our S&T relationship with the Commission.

I observe first that the multinational science and technology cooperation in Europe preceded the establishment of the EC programs, and it continues to parallel those programs. However, the EC is emerging as an important organizational avenue for intra-European country cooperation.

It has shown that it can organize and direct research programs that run smoothly and produce significant levels of benefits for the participants.

I would also note, partly in connection with the conversation that just took place, that EC spending on science and technology as a community is small in comparison with that of the member states. The Commission itself employs about 2,000 S&T personnel, of whom about one- fourth, or 500, are active researchers. The total R&D budget of about $1.2 billion annually is dwarfed by member state spending, public sector spending of nearly $40 billion. So it is about 5 percent, or something like that, or less than 5 percent, 2 percent.

The great majority of EC sponsored R&D is carried out under the Commission's FRAMEWORK program, which is a strategic planning and organizational umbrella for all EC shared cost contract work. It began in about 1984, and presently it is funded at about $1 billion per year.

It was a response to a perceived need to provide coherence to a number of R&D activities which had grown up in a kind of ad hoc way since the 1974 adoption of the generalized science and technology function within the Commission.

The FRAMEWORK is currently in its second phrase, budgeted at about $6 billion for its five-year span. By comparison, total EC member state public sector R&D funding during that same period would be about $250 billion. To date, the FRAMEWORK has emphasized pre-competitive R&D and I will say largely applied research. And I am willing to characterize it a little bit.

It has included very little basic research. This could change, because there is a revision of the program that is supposed to be completed by the end of this year, and the Commission is considering university-centered basic research programs.

The largest program within FRAMEWORK is ESPRIT. The objective of ESPRIT is to stimulate advanced R&D in computer and information technologies. The EC is funding this at slightly less than $2 billion over the five-year period. As with other FRAMEWORK programs, is it funded, matched on a one-to-one basis.

The second-largest program is RACE, which is focused on building a wide-band telecommunications network in the Community. The Community funding for RACE is about one- third that for ESPRIT.

There are a number of other FRAMEWORK programs. Those are the two largest. We can talk about some of the others, if you would like.

The **Chairman.** Would the gentleman hold at that point?

Dr. **Moore.** Sure.

The **Chairman.** I think it would be very beneficial—because we know of your expertise and background in this field—to clarify just a little more what FRAMEWORK does. In looking at your testimony, it brings together exactly the point that Mr. Volkmer was making, Government, industry, universities, and so forth.

Give us a layman's view of the FRAMEWORK program.

Dr. **Moore.** Well, as I said, the total funding for FRAMEWORK is relatively small, compared to total R&D spending in the member states.

The **Chairman.** What is FRAMEWORK to achieve?

Dr. **Moore.** It is supposed to stimulate cooperative R&D, to demonstrate the value of cooperation in R&D, and to produce some results. I come back to this a little later in my statement.

But in my opinion, it is achieving some of these objectives. In particular, it is demonstrating to the member states that intra-European cooperation in science and technology can and does work. I think that is a very important contribution.

The **Chairman.** If the gentleman would yield one more second, you are saying on page 2 of your long testimony:

> "FRAMEWORK programs . . . have taken form as multinational applied, or 'pre-competitive' technology research efforts, bringing together a cross-section of universities, public sector research centers, and industry from all parts of the Community."

We have listened to people say that we do not need additional legislation, and there is great doubt we would not be holding the hearings in the first place, from our point of view.

The next point that is obvious to us is that—again, Mr. Volkmer pointed this out—that in Japan and Europe they are able to consolidate their efforts of business, industry, and universities, in a much more cohesive form than we can at the moment. We are not so sure that we are dealing with the tools of the 21st century at this point, as far as our structure economically is concerned. I think that we can learn from this.

Dr. **Moore.** No doubt, we can learn from it.

I would say that we have been making strong efforts in the U.S. to improve the cooperation between government and universities and industry. And I think, in fact, that if you compare us to Japan, the cooperation between universities on the one hand and industry on the other is probably better in the U.S. than it is there.

And as you know, Mr. Chairman, we have been, in the National Science Foundation, stressing this point very strongly over the last several years, with the development of the engineering and research centers program, the science and technology centers program, the industry-university cooperative research centers program, and so on and so forth.

But I certainly agree that this is an area that needs to be strengthened, and we are pressing on that ourselves, as strongly as we can.

The **Chairman**. One more point. There is an old statement that goes: "The operation was a success, but the patient died." You listen to all of the testimony over the last two days, and all we have heard about what we are looking at is, it is coming along, we have to wait and see, we will look in the crystal ball, and so forth and so on, and they are not doing as well as we are, except—and then they talk about the HDTV situation, and on and on and on. We are not supposed to join together to do anything about that. Maybe it should go to private business.

We have to come up with some methodology here that is going to allow our companies and our country to move ahead in specific areas which we are concerned with. The Japanese have been able to successfully identify those areas—and I am not bashing the Japanese, more power to them, they are getting there.

I think if we look to all of the negatives all the time, we are not going to be able to achieve a framework, and that is where the Chair is concerned.

The gentleman can proceed.

Dr. **Moore**. Let me make one comment. I certainly agree very strongly with you that the Europe 1992 presents us with enormous challenges. And we have not been, I think—we have been a little bit slow to take that up. And I think we need to pay a lot more careful attention to it.

One always hates to be too parochial in these matters, but for your information the National Science Board is taking that up with a special task group that has just been established to assess what that may mean for science and technology in the United States. That task force will begin its work within the immediate future.

I was going to comment a bit on the EUREKA program, which is not formally, as you know, one of the EC programs. It is instead an industry-led, government-sponsored consortium of 19 nations plus the Commission of the European Community, whose focus is a little bit further downstream on applications technologies with clear commercial development potential.

EUREKA is funded at about $1 billion a year. About 15 to 50 percent of the funding for each project comes from government sources. EC is a member of the consortium, but does not have a dominant voice in project selection.

Many EUREKA projects are in electronics and information technologies, and of course one of the most prominent ones is the HDTV project.

I would draw attention to another one that has just—it is essentially getting underway, and that is JESSI, the semiconductor project, the aim of which is to develop a world-class European capability in next-generation integrated circuits. It is just in its definition stage, and it has been compared to SEMATECH here in the

United States. It could become very large. The budget figures are in the range of $4 billion over a period between now and 1996. About seven years have been mentioned. The actual budget, and how it may be shared have not yet been determined.

Both Community programs and EUREKA provide for participation by foreign-owned—that is to say, non-EC and non-EUREKA—companies, as long as they have what is called an "integrated presence" in Europe. That means, companies that have production, marketing, and research operations in Europe.

I think it should be pointed out that eligibility to participate, and actual participation, are not identical ideas. The proof of the pudding is in the eating, in that case as always.

ESPRIT and RACE, I have mentioned. They are leading programs in the FRAMEWORK program, the effort of the EC to improve industrial competitiveness. Several other areas have been targeted also in the FRAMEWORK program. Materials and technologies for use in manufacturing, aeronautics, biology and biotech and energy.

I should also mention that the EC also operates four laboratories in Belgium, Italy, the Netherlands, and West Germany, that conduct research on a variety of topics. The combined budgets of those laboratories is about $230 million.

Coming back to the point that you were making a moment ago, Mr. Chairman, the EC programs, by demonstrating the value and practicality of cooperative research, and by building up networks of relationships among firms and researchers are changing the nature of R&D in Europe.

It should be understood again, as I mentioned, that an underlying purpose is to demonstrate the value and practicality of cooperation in science and technology. I think it is clear that, as I mentioned, these programs have begun to accomplish some of their aims.

Furthermore, I would mention that the push behind the European economic integration and behind science and technology cooperation which accompanies that, is strong but not unanimous, as I think is well known.

In science and technology, there are significant differences in S&T capabilities, that divide northern from southern Europe, and large from small countries; differences of political ideology and national tradition regarding the role of government in S&T activities are also impediments to cooperation in S&T.

The academic, business, and public sector research sectors all have varying priorities and perspectives on Community-supported research. Divisions exist within the European Community structures, and even within the Commission itself about S&T funding levels and new initiatives. It is a big bureaucracy. After all, they have about 17,000 employees at the Commission.

What this means in practice is that integration is evolving, and its differences are resolved. Even in the relatively less contentious field of science and technology cooperation, the parameters for participation are far from set.

We can talk for a minute about conditions and issues for U.S. participation, and in particular about access. The single market movement toward integration has not had so far a significant effect on the actual state of access by U.S. in insertion into the European system. Basically, all research conducted in universities is still open and accessible. Relatively little basic research is performed by the corporate sector, and only a small percentage of corporate advance technology R&D is being done through EC programs or through EUREKA, except in information and telecommunications.

In other words, what was open to us before largely remains open today. This could change, of course. And I think we have to follow closely the legislative and regulatory developments in the Community that might affect our access to European S&T.

We need to develop and maintain effective channels of communication with the Community for that purpose. In any dialogue with the EC, we need to take a number of factors into account. They include things like researcher access, resource sharing, intellectual property, technology transfer, and private sector participation.

Mr. Chairman, we share a great deal with the member nations of the European Community. We must also recognize that an increasingly strong and cohesive Europe presents us with challenges in science and technology. In seeking greater independence, the Europeans will be wary and assertive in a lot of issues, such as technology transfer, dual use technology development, competition for resources, participation by non-European nations in their R&D programs.

We will be—I say are—facing significantly stronger competition in science and technology, as European capabilities and cooperation grow.

As was said by Secretary Shaw a few minutes ago, I believe it is true that most European leaders recognize and acknowledge that to restrict cooperation, to move to protectionism, particularly in S&T, would be detrimental for both sides of the equation. They agree that the natural competition in trade and services should not be allowed to limit the sharing of basic knowledge and the resources to pursue it.

Does this relieve us from the need to be wary and watchful ourselves? Obviously not. But I believe that we should approach our future relations with Europe in the tradition of the past, seeking to continue cooperation in research and development, while guarding our own interests.

We face many common problems with the Europeans, issues that did not respect national boundaries. Cooperation in research is the only rational way to approach these problems.

Mr. Chairman, thank you very much, and that concludes my remarks.

[The prepared statements of Dr. John Moore and Dr. Richard Bradshaw follow:]

TESTIMONY

DR. JOHN H. MOORE

DEPUTY DIRECTOR

NATIONAL SCIENCE FOUNDATION

COMMITTEE ON SCIENCE, SPACE AND TECHNOLOGY

U.S. HOUSE OF REPRESENTATIVES

WASHINGTON, D.C.

MAY 17, 1989

EUROPE 1992

Mr. Chairman, it is my pleasure to appear before you today to speak on the topic of European Community (EC) efforts to fund and coordinate cooperative science and technology (S&T) in Europe, as well as on the implications for the United States S&T base. I would like to provide a brief overview of the role, importance and nature of the EC-funded research programs; to comment on the conditions of and major issues facing U.S. participation in them; and present the broader context of formalizing our S&T relationship with the Community.

As we approach the watershed year of 1992, many in the science and technology communities in the United States are beginning to express strong interest in the coming European Community "Single Market" and its bearing on S&T in Europe. The questions most prominent are, first, what is the pace and direction of S&T integration in the EC and, second, what effects will such integration have on traditional U.S.-European patterns of S&T interaction?

THE COMMUNITY ROLE IN S&T COOPERATION

We can still distinguish between movement toward multinational scientific cooperation in Europe (and perhaps eventual integration) and the rapidly evolving economic and financial integration which is the aim of the EC's 1992 Plan. Basic science in Europe has always been the domain of university and national laboratory researchers and, as such, has been characterized by free and open exchange. Moreover, international cooperation and collaboration has been, and remains, a significant aspect of basic research in every EC country with a highly developed research sector. Spokesmen for the research community in Europe continue to state strongly that this will be equally true following the implementation of the 1992 Plan.

While there is no evidence that national control over the direction and support of basic research has been diminished to date, the progressively strengthened role of the Commission of the European Communities (CEC) is providing an umbrella for strategic planning and coordination of resources devoted to such research. The Commission's applied technology programs such as ESPRIT (information technologies) and RACE (telecommunications infrastructure development) have demonstrated that significant shared benefits can be produced through multinational collaboration. The Commission's stock as an efficient manager of R&D has risen correspondingly in both the political arena and the public eye.

There are indications that the Commission is now turning its attention to the field of basic science and intends to propose a multi-billion dollar effort over the next five years to promote close cooperation in fundamental research among researchers throughout the EC. In large part this is due to the success of the applied technology programs as models of cooperation and to the increase by each EC member state of both domestic support for applied technology and involvement in EC-wide cooperative activities.

The scale of R&D funding of all types by the Community is still minuscule by comparison with that of member state domestic S&T programs, even limited to non-defense S&T. Among the four largest EC countries, such support runs from eight to seventeen times greater than combined Commission funding for R&D. The EC's own R&D capacity consists only of four Commission-run research centers, whose personnel total roughly 2,000 (of whom less than 500 are active researchers) and whose combined budget is only $200 million annually. Its $6 billion FRAMEWORK program (1987-91) for strategic coordination of Community-funded R&D is almost entirely a shared-cost, contract program. The actual research and development activities are performed at member state facilties, employing member state researchers and support staff, using member state equipment. As a rule, the Commission provides no more than half the cost of any project; the remainder is provided by public or private funds from the member states.

PRIMARY VEHICLES FOR COOPERATION: FRAMEWORK AND EUREKA

The European Community research program has a varied history, beginning with the establishment of the European Coal and Steel Community (ECSC) in 1951 and the Joint Research Center (JRC), set up under the Euratom Treaty in 1957. The ECSC research is still carried out by the Commission, and JRC work, initially concentrated on nuclear energy development, has since ceased in that area and has diversified into a number of other scientific and technological fields.

In 1974, the Council of Ministers decided to extend EC activities to the whole of science and technology and directed the Commission to implement sector R&D programs in energy, the environment and raw materials. Subsequently, research evolved in fragmented fashion in other major S&T areas like biotechnology, new materials, and information technologies. Most of this second-generation work was being conducted outside of the JRC by contracted reseachers, and it was decided in the early 1980's to develop a coherent strategic planning framework for such R&D. Thus, in 1984, the first FRAMEWORK program was instituted. It is through this research planning mode that the EC has moved toward cooperation and eventual integration, while the role of the JRC has diminished considerably over the past decade.

The FRAMEWORK Programmes (currently the third year of the second five-year program) have taken form as multinational applied, or "pre-competitive" technology research efforts, bringing together a cross-section of universities, public sector research centers and industry from all parts of the Community. The initial FRAMEWORK Programme (1984-87) was funded at roughly $4.1 billion, with half supplied directly by member state entities. The second Programme (1987-91), at over $6 billion, is already being revised and its total funding commitment may well be doubled by the end of 1989. By comparison, total EC member states' public sector funding for all types of R&D during the same period (1987-91) is estimated to be $215 billion, or thirty-six times greater.

An overview of FRAMEWORK II and a full description of those programs corresponding to NSF's area of research funding responsibilities is provided in the addendum to this testimony, entitled European Community Research Programs Relevant to NSF Funding Parameters. These fields are: information and communications; new materials and industrial modernization; biotechnology; and improvement of European S&T cooperation and resource utilization.

In the same document is a description of the EUREKA program of research in technologies with clear commercial promise. EUREKA is not a Community program or initiative; it is industry-led and directed through an independent Secretariat. However, the EC is a member, along with 19 West European countries, of the the consortium. The EC contributes to its R&D activities where they lie within the established EC research program parameters, but has no more voice in overall planning than any other country. Public-source funding of EUREKA projects can vary from 15% to 50%, depending on the interest of the funding nations' governments. EUREKA is currently expending approximately $1 billion annually.

One example of EUREKA cooperative R&D worth noting, largely for its precedent-setting potential regarding issues of access, is the JESSI (Joint European Semiconductor Silicon) program. JESSI is a joint venture of the Dutch Philips group, Siemens of Germany, and the Franco-Italian consortium SSG-Thomson. Its purpose is to develop technologies for design and production of a next generation of large-scale, submicron integrated circuits. Financing of roughly $500 million annually for seven years (totaling $3.5 billion) will come equally from the industrial partners and their supporting governments, including the EC.

At present, the European share of world semiconductor output is less than ten percent, and technological capabilities in Europe are behind those of the U.S. and Japan in this field. Thus, the overriding goal of the project is to bring Europe back to a competitive par in this field, in large measure to underwrite other R&D in information and computer technologies. However, Europe's answer to SEMATECH has been beset continually by disagreements among the Dutch and Germans and their governments, on one side, and the French and Italians and their governments on the other. The struggle has centered on the division of responsibilities within the research project and the sharing of intellectual property rights stemming from the research. The project is on-line and operating, but difficulties in meshing the partnership are likely to impede its potential for some time.

THE IMPORTANCE TO EUROPEAN S&T OF EC RESEARCH PROGRAMS

The strength of CEC programs is threefold: they are focused on advanced technologies with high apparent potential for commercialization; they work to aggregate the scientific and technological resources of Europe and encourage synergistic benefits in ways impossible for member state domestic research programs; and they provide impetus to the lowering of technical and regulatory barriers to competition within Europe, thereby encouraging development of production economies on a par with those of the United States and Japan, reducing the latters' distribution and marketing advantages.

Commission programs have thus accrued leverage far out of proportion to their relative funding weight by directing and coordinating resources in ways designed to stimulate wide-scale participation and rapid achievement of results. This process tends to level the playing field in Europe for subsequent commercial competition while simultaneously building collective competitive strengths vis-a-vis the U.S. and Japan. Until recently, however, EC programs with any basic research content were restricted to in-house work in the field of nuclear energy. Even at present, basic research support accounts for only a tiny portion of Commission S&T funding.

This approach was deemed critically necessary to the recovery of economic health in European advanced technology applications. For instance, between 1979 and 1985, high technology market sectors in the EC countries grew only 3% yearly, compared to 3.7% in the U.S. and 17.1% in Japan. During this same period, the EC countries showed net declines in exports in every high tech industry except chemicals and pharmaceuticals. As importantly, the rate of high tech imports grew faster than the rate of intra-EC trade in the same categories. All this illustrates an economy becoming increasingly dependent on technology development taking place outside of Europe.

The goal of the FRAMEWORK Programme is to establish models for, and to institutionalize the pattern of, cross-fertilization in research and development work through EC coordination of resources and financing which reside in the member states. The more immediate objectives of the Community-sponsored R&D are to raise the capabilities of European applied technologies R&D to the level of the U.S. and Japan; to break down barriers to cooperation in research between EC countries, between firms, and between research institutions; to foster university-industry linkages in basic and applied sciences; and to encourage the mobility of S&T professionals and equal treatment of professional and academic credentials throughout the Community.

These objectives have only recently, since 1984, begun to be implemented, and it is difficult to discern yet whether they are actually succeeding. It is not difficult, however, to perceive that the vast majority of informed Europeans - politicians, businessmen, the S&T community, and the public at large - want these programs to succeed. Frequent polls indicate that large majories of opinion exist in favor not only of the economic Single Market, but for most forms of integration, including especially S&T. This means, for the U.S., that we must quickly begin to consider the implications of dealing with two modes of relations in S&T: the traditional, bilateral forms of interaction, which remain strong and extensive, and a rapidly developing relationship with Europe as a whole.

THE NATURE OF INTRA-EUROPEAN S&T COOPERATION

Multinational cooperation within Europe has existed for many years, predating the Commission's adoption of S&T programs, in such fields as conventional and nuclear energy production; high energy physics; basic research; and technology development programs. Some of these involved only EC countries, but others have incorporated virtually the whole of non-communist Europe. Organizations like CERN (high energy physics), ESA (space flight and science), ESF(basic research) and COST (basic science-to-precommercial development) all have contributed in a modelling role to the design of both the Community's FRAMEWORK Programme and the industry-led, public-private EUREKA program.

However, the Commission's initiatives move beyond the imperatives which motivated the establishment of these organizations. The Commission offers the prospect of managing European S&T on a basis which is not restrained by narrow focus, voluntary membership, statutorily-limited authority, small-or-declining financing, or inadequate organizational capabilities.

Commission programs in applied technologies, by and large, have received the support of the Council of Ministers and the member states the Ministers represent - largely because these programs are demonstrating to the member states how to organize and promote research in ways and in scope difficult to implement at the national level. As successes are gained, the impetus is to move the locus of research coordination higher up on the scale. New research projects embodied in the FRAMEWORK II program are considerably less applied in nature than their predecessors, embodying elements of basic research. Furthermore, the Commission is presently reviewing a proposal to initiate a large-scale, dedicated basic research program.

It is at this point that member state support is uncertain, for Commission direction and funding of fundamental science puts the EC squarely into an arena heretofore reserved to national governments. Moreover, basic research is something which member states have fostered successfully on a individual basis and which they have a deep stock of expertise in supporting and managing. For this reason, the prospect of a basic research function lodged in the CEC has encountered some resistance. However, as the national governments shift their domestic priorities and resources increasingly to applied technology work, without significantly increasing their overall civil S&T budgets, that same prospect is appealing to other EC members. The political process for securing EC adoption of the proposed basic research program is likely to take up to a year, if successful, and warrants particular attention for its potential long-term impact on US scientific resources and traditional US-European bilateral S&T activities.

EC INTEGRATION: DIVISIONS AND UNCERTAINTIES

It is important to keep in mind, although easily overlooked, that Europe is not of one mind on what the 1992 Plan means or how to implement it. While the strong majority of participants in the integration process are committed to its early success, there exist a variety of views and agendas. Among the member states, significant differences in S&T capabilities and economic interests separate the countries of northern Europe from the Mediterranean nations, as well as dividing the larger members (Germany, France, Italy and the UK) from the smaller ones.

Within the EC, conflicts are being played out among the Commission, the Council of Ministers and the Parliament, each with its own priorities and methods of exercising power. The Commission itself is still beset with serious and long-standing "turf struggles" which make it very difficult to arrive at consensus on initiating new legislation or establishing executive authority to implement the existing agenda for integration. In the realm of science and technology, divisions are quite evident among the academic, business, and public sector research communities - each having a different constituency and perspective on where its long-term interests lie.

What this means in practice is that European integration, whether economic or S&T, is a concept which is only slowly evolving into concrete form. Its implementation is characterized more by factional, often contentious lurching toward the goal than by a consensus-based, smoothly-executed plan of action. Action on dismantling the 287 legal or regulatory barriers identified by the Commission as obstacles to integration has drastically slowed in the past year, with only the easier half of them dissolved. Most of those remaining will require severe compromises in national priorities, self-image or traditional concepts of sovereignty.

In the field of S&T, integration may proceed more quickly and rationally at the level of basic research, simply because the barriers to transnational collaboration are fewer than in the economic sphere, where linkage to applied technologies is much more evident. Yet here, too, the path is far from clearly marked and the desired limits to cooperation are still undefined.

U.S. PARTICIPATION IN EUROPEAN S&T: CONDITIONS AND ISSUES

Participation in the European system of R&D by U.S. researchers and companies is still relatively unaffected by the momentum of the 1992 Plan. Practically all basic science research is still as open to Americans - on the basis of bilateralism - as it has ever been. Relatively little basic research is yet being conducted in the corporate private sector. In the area of applied technologies, the closing of access to U.S. companies is a potential threat. Only a small percentage of R&D being done in the corporate sector - of the European total - is done under the EC or EUREKA structures, although that portion is concentrated in the information and communications technologies. Moreover, the advertised long-term aim of these programs is not to supplant private sector capitalization of applied R&D, but to demonstrate how it can be more effectively used by transnational consortia. How this actually works out remains to be seen, however.

U.S.-based firms, as well as some with significant operations in Europe, are ineligible to participate in the multinational European publicly-supported applied technology programs. However, provision has been made legally for inclusion in Community programs of any foreign firms which have an "integrated presence" in the Community; specifically, foreign firms which have production, marketing and R&D capabililities located in an EC country are considered under EC regulations to qualify as EC-based firms. The qualifications extend to EUREKA projects as well. Informal surveys, taken by the Commerce and State Departments, of large U.S. multinational corporations in Europe seem to indicate that these firms, with European R&D facilities, are generally disinclined to join collaborative research programs. A small number of U.S. companies are, however, included in EC programs as subcontractors. Apparently, it seems that the door is not entirely closed to U.S. access to EC R&D through participation in the research programs.

We may want to put significant effort at the federal level in exploring the opportunities which currently exist and attempt to expand them, keeping in mind the Europeans' apprehension over past U.S. success in dominating the European market in high technology products. Overtures have been made by the EC to initiate an informal dialogue on the topic of mutual access to R&D, leading eventually to discussion of a high-level agreement on S&T cooperation.

Another area of critical importance for U.S.-European Community cooperation is that of technical standardization and regulatory practices, which affect both technology applications and basic research. Community-wide standards and regulations can be designed to stimulate or favor certain types of R&D, and certain research performers, at the expense of others. If the U.S. is neither included in the standards-setting process nor even kept current on trends and probabilities in that process, American technologies may well be prevented from competing in Europe for product development or sales.

Equality of access to capital, public procurement and other forms of R&D financing is also an issue for U.S.-EC discussion. If the playing field is so construed that technology incubation and development is effectively subsidized and protected in the EC, to the exclusion of U.S. participation, then U.S. firms will be handicapped competitively with eventual consequences for future R&D performance. It will be important to reach agreement with the EC, and with individual governments as well, that public support for building the structure of multinational collaboration within the EC does not serve to excuse widespread subsidizing of technology development with clear commercial applications.

THE CONTEXT FOR U.S. POLICY-MAKING

If the U.S. wishes in the future to engage in discussions with the EC concerning specific areas of cooperation in science and technology, there are certain items - depending on the nature and extent of the cooperation being considered - which ought to be addressed. Among the more important of them should be: freedom of access for researchers to basic science and engineering programs, facilities and investigators; provisions for sharing of major scientific facilities and information networks; intellectual property protections; definitions pertaining to and conditions of access to publicly-funded applied technology research; and provision for US and EC private sector participation in each other's comparable publicly-funded research programs.

In order to make certain that these factors are taken into consideration as a matter of policy in any foreign cooperative S&T ventures, the Executive Branch, with NSF participation, is working to develop guidelines for establishing: desired U.S. goals in pursuing cooperative S&T projects: the views and interests of affected U.S. constituents; our abilities and willingness to undertake responsibilites and pursue opportunities conferred by such cooperation; and the potential risks and consequences of such cooperation.

Understandably, there is much uncertainty and a little apprehension in the U.S. science and technology community - as in the business community - about the shape of Europe post-1992. However, the uncertainty is equally apparent within Europe, and many of our European counterparts are reluctant to damage or sacrifice good relationships with the U.S. in order to achieve an integrated Community. They understand just how detrimental a "Fortress Europe" would be to economic and technological progress on both continents. We are, and will remain, each other's biggest trading blocs; largest sources of technology transfer; primary external investors; most significant providers of S&T exchange; and, not least, most dependable allies.

We both face demographic shortages of potential science and engineering professionals, as well as strained resources for training, facilities and instrumentation, and direct research support. Hence sharing what resources we do have, and making most efficient joint use of them, must be a high priority. Competition in trade and services will almost certainly intensify, to the benefit of all consumers, but that competition should not be used or allowed to limit our sharing and exchange - where feasible of S&T resources and knowledge. There is much to be gained in pursuing the synergy of cooperative R&D. This is strikingly true as regards the high cost of new research programs and large, complex equipment.

We must recognize that, in European eyes, too close a relationship with the U.S. risks a dependency on us, and hence a subordination of their capabilities to our interests. Thus, they are actively pursuing ways to encourage closer European links with Japan, Eastern Europe and the Soviet Union. Their success in doing so will inevitably cause uneasiness, at the least, on our part. In practical terms, it will raise questions about the emergence of a highly competitive situation vis-a-vis "dual-use" technologies; an independent "third man" in our calculations for dealing with Japan, the Soviet Bloc and the Third World; and increasing competition for resource allocations in both scientific research and technology development.

Faced with this evolving situation and a lessening preponderance of U.S. influence in the arena of international S&T cooperation, we should begin now to reassess our approaches to protecting and advancing U.S. interests in scientific exchanges, cooperation and technology transfers. An initial part of that process may require exploring the nature of what constitutes our longer-term interests in this arena.

Most Europeans, including Community politicians and administrators, do not want to jeopardize the matrix of U.S.-European relations. At the same time, many do want to build a unified and coherent Single Market. The U.S. government can and should look for every opportunity to assist them, while just as keenly protecting our interests built on traditional bilateral relations.

The rising costs of research and development, and the complexity of finding scientific and technological solutions to global crises, mean that large-scale, multinational efforts may have to become normative for some fields of R&D. Requirements for such R&D will be beyond the resources not only of individual companies, but of single nations as well, no matter how well endowed with talent. In the end, we and Europe must find convincing ways to show that a healthy economic competition likely to result from the Single Market does not prelude equally healthy cooperation in the kinds of S&T activities likely to require our joint efforts for their success and growth.

EUROPEAN COMMUNITY RESEARCH PROGRAMS RELEVANT TO NSF FUNDING PARAMETERS

by

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EUROPEAN COMMUNITY RESEARCH PROGRAMS RELEVANT TO NSF FUNDING PARAMETERS

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Overview of EC Framework Programme: Legal Basis, Responsibilities, Funding & Mechanisms

European Community cooperation in science and technology prior to the enactment of the Single European Act, signed in early 1986 and effective on July 1, 1987, rested upon a broad interpretation of the catch-all provisions of Article 235 of the EEC Treaty (1957), which was employed from 1974 (by Council Resolution) to cover the coordination of national policies and research projects in science and technology.

It was under this somewhat ambiguous legal structure that the first **Framework Programme** (1983-87) devised and implemented a broad array of research and development programs in both basic and applied fields, thereby furnishing a planning instrument for the realignment of scientific and technological research at the Community level. As stated in the CEC publication, Vade-mecum of Community Research Promotion, "the first framework programme defined priorities, set out selection criteria for Community actions and established a financial framework. The inclusion of the improvement of industrial competitiveness into the catelogue of objectives for the first Framework Programme merits particular attention. This extension of the range of objectives opened up a new area for action by Community researchers."

According to Paolo Fasella, longtime director general of DG XII (S&T), the Framework programs rank "halfway between purely basic research and commercial development. Generally speaking, [they cover] targeted basic research and precompetitive technological development."

Under the privisions of the Single European Act, Article 24 provides for extension of the EEC Treaty to include Title VI, "Research and Technological Development" which defines the objectives and methods of implementation for Community research and technological development. While the new legal basis for EC R&D activities provides a much sounder context for **Framework 2**, it has not altered either the continuation of previously initiated programs or the implementation of new ones.

In addition to funding specific research programs conducted in the Member states, the Community is now officially responsible for:

o "the implementation of research, technological development and demonstration of programmes including support for cooperation between firms, research centres and universities;

- the promotion of cooperation with third countries and international organizations;
- the dissemination and evaluation of results;
- the promotion of training and of the mobility of researchers in the Community;
- initiatives to promote the coordination of national policies and programmes."

The control of these tasks is effected through a multi-year R&D program adopted by the EC Council, establishing S&T objectives, priorities, principle program features, funding levels and Member state contributions, and distribution of the funds among various research activities.

While approval of each of the two **Framework Programmes** as a whole required unanimous consent of the Member states, specific R&D programs are adopted by a qualified majority of the Council. For each program, the Council determines the scientific/technological content, term of activity and an approximation of the level of funding necessary to complete the program.

Total funding for the first Framework Programme was 3.75 billion ECU, while that projected for the second Programme is 5.4 billion ECU. Against these sums, the EC Commission has estimated the public expenditures by Member states for R&D in the period 1987-91 will total 230 billion ECU, with an equal amount to be spent by other performers. (1 ECU = $U.S. 1.12)

At the level of research program implementation, the Community, working through its Directorates-General, has three types of administrative and technical instruments available. The first, Joint Research Centre activities, is conducted independently by the Community through its own research staff at the four Centre facilties: Ispra, Italy; Geel, Belgium; Petten, Netherlands; and Karlsruhe, FRG. The second mechanism, accounting for the huge bulk of R&D expenditures and including **Framework**, is shared-cost contract research conducted at universities, research centers or private sector firms, generally on a cost-shared basis. The third form of R&D support is through coordination at the Community level of programs which are funded and carried out entirely at the Member state level. The Commission role is confined to coordination and information storage and exchange.

Essentially a detailed blueprint for the types and levels of high-technology cooperation necessary to provide European industry with an internationally competitive underpinning, **Framework** allocates much of its resources and plans to four sectors of particular importance to the National Science Foundation. Those areas are: information and communications technologies; new materials and industrial technologies; biotechnology; and improvement of European S&T cooperation and resource utilization.

The individual research programs within these categories, both carryovers from Framework 1 and newly-initiated or planned within Framework 2, are discussed below. The accompanying charts show funding levels and duration of research activity for all programs, under both Framework programs, as well as the relationships among categories of Community-supported S&T activities.

Before providing an overview of each of the major research programs pertinent to NSF's work, it is worthwhile to give a brief summary of the nature and objectives of those programs:

ESPRIT:	Fundamental and applied research in information technologies in the areas of microelectronics, software, advanced information processing, office systems and computer integrated manufacturing.
RACE:	Primarily applications R&D in advanced telecommunications technologies leading to European-wide implementation of Integrated Broadband Communications based on ISDN technology.
BRITE:	Principally applications research in advanced technologies for traditional industries, as a contribution to industrial competitiveness.
EURAM:	Fundamental and applied research to create, synthesize or further develop new materials, or upgrade existing materials, at competitive production costs.
BIOTECH:	Precompetitive efforts to establish a supportive infrastructure for research; coordination/establishment of a Community-wide legal, regulatory, and standards structure. Includes CUBE (Concertation Unit for Biotechnology in Europe).
STIMULATION & SCIENCE:	Promotion of mobility of researchers within the Community and professional integration on selected projects; support for large-scale facilities and research projects; career development awards to stem the flow of researchers to the U.S. (Includes specific research projects in scientific fields.)
FAST and MONITOR	One of several programs under the general heading of improving the efficacy of S&T potential, FAST is directed to identifying and assessing scientific and technological changes in order to highlight their longterm implications for Community R&D and economic competitiveness, while offering policy and program options.

COMETT:	A comprehensive scheme to develop transnational, EC-wide training programs at the university level and to encourage industry-university cooperation in scientific and technological training and human resource development.
ERASMUS:	A program of intra-Community student exchanges for study and research in sciences and related disciplines.
SPRINT:	The largest of several programs designed to encourage scientific and technical innovation throughout the Community.
EUREKA:	Not an Community program, this is a five-year old French initiative to encourage collaborative European multinational efforts in applications R&D aimed at increasing industrial/economic competitiveness in world markets in a variety of advanced technology fields.

ESPRIT

(European Strategic Program for Research and Development in Information Technologies)

ESPRIT was launched by the European Community in February 1984 to provide European information technology (IT) industries with the basic technologies to meet the conditions of the nineties. Such a program was considered badly needed in face of the erosion of European information technology companies' competitiveness. Between 1978 and 1985, the share of European companies' production in microelectronics had declined from one-third to one-fourth of world production and the trade balance in IT products showed a similarly unfavorable trend. The Community trade deficit in electronics in 1986 was 15,000 million ECUs. Europe is a net importer of ICs and information processing and office systems products.

ESPRIT was also designed to promote European industrial cooperation and the development of common information technology standards, as well as the encouragement of transnational EC partnerships among universities, industrial enterprises and research centers doing R&D in information technologies. ESPRIT was further intended to take advantage of the economies of scale of the EC internal market to spread R&D investment costs and to reduce payback times.

ESPRIT covers the fields of microelectronics (VLSI), software development, advanced information processing, computer integrated manufacturing and integrated office systems. A ten-year program, divided into two five-year phases, it is financed jointly by the Commission (which provides 50% of funding) and participating institutions and enterprises. ESPRIT 1 (1984-1988) was a precompetitive research program with a total budget of 1,500 million ECUs ($1.7 billion).

Approximately 220 proposals were accepted and funded, of over 1,000 submissions, which involved roughly 450 firms, universities and research centers employing about 3000 scientists and engineers. Large, medium and small-scale participants were all well-represented, with industry accounting for over half. The general consensus among participants, as well as the finding of the official EC review (the "Pannenberg report"), is that ESPRIT 1 was a huge success in breaking ground for trans-European scientific and industrial cooperation among diverse participants, in paving the way for a common European front in international standards negotiations, and in achieving advanced technological applications in industry.

In December 1987, the EC research ministers approved a second phase, ESPRIT 2, with twice the budget of ESPRIT 1, or 3,200 million ECUs (roughly 45% of the total Framework budget). It will be open to EFTA countries as well, provided that each EFTA participant in a project have at least two EC partners. While ESPRIT focused on upstream applications R&D, the second phase will concentrate on extending the results of that research to market applications. Thus about one-fourth of the total budget (800 million ECUs) will be earmarked for Technological Innovation Programs (TIPs). At the other end of the spectrum, 60 million ECUs has been set aside for continuation of basic research in three primary areas: microelectronics and peripheral technologies; information processing systems; and IT applications, with the latter receiving the greatest emphasis. The 50% cost-sharing formula has been retained.

Following the enactment of ESPRIT 2, a Call for Declarations of Interest (e.g., RFPs) asking for large-scale demonstration projects has resulted in some 700 proposals.

ESPRIT, along with RACE (telecommunications) falls within the jurisdiction of D.G. XIII, headed by Michael Carpentier.

Information on specific program participation requirements, subcategory objectives and financing, and specific projects funded and their participants for ESPRIT 1 and 2 is available from NSF/INT/I&A.

RACE

(Research and Development Programme in Advanced Telecommunications Technology for Europe)

RACE was launched in July 1985 with the aim of creating, by 1995, within the EC and possibly including other Western European countries, an earth communications network called Integrated Broadband Communications (IBC), based on integrated service digital networking (ISDN). Such a system will be able to handle a wide range of communications services, both one-way and interactive, using voice and video simultaneously. Although EC countries have continued to be leaders in telecommunications technologies throughout the 1980's, Europe's technological parity with the U.S. and Japan is perceived to be slipping.

The initial RACE definition phase included the large telecom industrial conglomerates, member state PTTs, research centers and private consulting and specialized product companies. Budget for the definition phase was 50 million ECUs, and like other programs, the Commission contribution was half the total. This phase was divided into 1) theoretical assessment work, and 2) shared cost research projects. The latter involved 109 participants in 30 projects in a variety of technological fields: VHSIC, complex ICs, integrated opto-electronics, broadband communications, dedicated communications software, large-area flat-panel display technology, HDTV, etc.

In October 1986, a five year program was initiated with a budget of 1100 million ECUs ($1.23 billion), with a Commission contribution of 550 million. Specific technology fields funded under the RACE program proper were to follow on the definition phase results, divided into three segments. The IBC reference model will be extended and functional specifications will be developed. The second segment continues research on IBC technologies, hardware and software, while the third focuses on stimulation and testing of IBC techniques to enhance their capability for integration into a standardized IBC system.

An extensively detailed description of the RACE program proposal is available in INT.

BRITE

(Basic Research in Industrial Technology for Europe)

Inspired by success in creating ESPRIT, the EC undertook the launch in March, 1985 of a similar framework for industrial technology R&D at the precompetitive, or generic applied, stage. The program is aimed at traditional, maturing European "smokestack" industries (aircraft, automobiles, chemicals, textiles, leather goods, etc.), with the intention of improving competitiveness through the introduction or upgrading of advanced capabilities in lasers, computer-aided design and manufacturing, membrane technology, new materials, catalysis and particle technology, new joining and assembly/processing techniques. Budget for the four-year program was 185 million ECUs ($206 million), with half furnished by the EC.

The industrial development component is dominant, evidenced by the requirement that university and research center participation be in conjunction with industrial firms. In preparing the program, several hundred companies were consulted as to the fields most in need of research upgrading and the likelihood of industry financing. Nine research areas were identified for targeted support: reliability, wear and deterioration; laser technology; joining techniques; new testing methods; computer-aided design and manufacturing (CAD/CAM) and software modeling; polymers, composites and power metallurgy; industrial membrane research; catalysis and particle technology; and new uses for flexible materials.

During this first phase of the program, 220 projects were funded, involving 880 participants, and initial results were presented at the first BRITE Technical Days meeting in December 1987. However, no evaluation has been completed as to the relative success of the program.

A follow-on, four-year program combining BRITE efforts with those of the EURAM program (see below) is scheduled to begin in 1989. It will focus on manufacturing technologies and advanced materials, and it will be open to EFTA countries on a case-by-case project basis. Budget allocations for the new combined program will be around 440 million ECUs ($493 million).

EURAM

(European Research in Advanced Materials)

EURAM provides support for basic and applied research in new metallics, engineering ceramics and composites. It is part of a broader EC research program which also covers minerals, raw material recycling, and wood materials. EURAM was initiated at the end of 1986 as a four-year effort with a total budget of 30 million ECUs ($34 million). The program was scaled back, however, with the adoption of the new BRITE/EURAM program and will terminate at the end of 1989.

The aim of the program is to provide the technological base for Europe to produce advanced materials which it currently must import or produce under license. Research is geared to developing new ceramic materials useful especially in advanced internal combustion engines; several types of composites (carbon- or glass-fibre synthetic resins) intended for aerospace, medical equipment and motor vehicle industries; and a variety of engineering ceramics.

A closely-related EC program in high-temperature materials is being run by the Joint Research Centre in Petten, comprising work on the mechanical strength and corrosion resistant properties of steels, alloys and engineering ceramics. It has led to the establishment of a data bank on characteristics of high-temperature materials for use in design and development of such materials. This program, funded entirely by the EC, has a total budget of 60 million ECUs ($67 million).

BRITE/EURAM

The Commission and the EC Council of Ministers decided in mid-1988 to merge the two major industrial science and technology programs, recognizing that R&D for advanced materials and for advanced design and manufacturing technologies are so close in their objectives as to be treated as one: the technological modernization of traditional industries. Thus, BRITE/EURAM will continue research in the fields identified in the previous, separate programs.

An integral aim is to improve competitiveness through cross-frontier cooperation between companies, universities and researchers in fields focused on precompetitive industrial applications. The program budget of 440 million ECUs ($493 million) over four years is divided, with 300 million going to manufacturing technologies and 140 million directed to advanced materials. Up to seven percent of the total budget may be spent on basic research on new materials.

BIOTECHNOLOGY

The Commission has committed the EC to large-scale support of biotechnology across a number of fields and issues. Its first program, Biomolecular Engineering Programme (BEP), a four-year program inaugurated in 1982, was designed to attack a variety of legal, institutional and scientific/technological "bottlenecks" inhibiting the application of molecular and cellular biology to agriculture and the agro-food industry. The research portion of the program was directed to enzyme engineering, genetic engineering and evaluation of potential risks associated with applications of such bio-engineering.

The program was implemented through training contracts for young university researchers; multi-annual shared-cost research contracts with laboratories; and meetings, information dissemination and professional publications. Its budget of 15 million ECUs supported 91 training contracts and 103 research contracts.

A total of 355 scientific articles were published, and 13 patents granted, which derived from BEP-supported research. Several "firsts" in gene cloning were reported. Moreover, 53 intra-EEC cooperation agreements were established among laboratories, involving joint research or sharing of staff and/or equipment.

The current program, the Biotechnology Action Programme (BAP), which began in 1985 and runs through 1989, is a pre-competitive program oriented towards strengthening the international competitiveness of European industry and agriculture through biotechnology applications. Building on the earlier BEP, it takes the research and training objectives farther toward establishing a large-scale infrastructure for industrial biotechnology. BAP covers research and training through three mechanisms: contextual measures (bioinformatics and collections of biotic materials); basic biotechnology research (enzyme engineering; genetic engineering; *in vitro* cell technology; *in vitro* testing; and risk assessment methodologies); and "concertation" of national and EEC policies.

Implemented along similar lines to BEP, the BAP was originally funded at 55 million ECUs ($62 million), funding 250-300 training contracts and over 250 research contracts. An additional 20 million ECUs was allocated in 1988 to cover the extension of BAP support to projects involving Spain, Portugal and Greece, following their admission to the Community. Of the 1,450 proposals received, 80% were transnational in character and 35% were derivative of specific industrial interests.

The "concertation," or coordination aspect of the program is handled by the Concertation Unit for Biotechnology in Europe (CUBE), headed by Dr. Mark Cantley. It provides concrete direction to the Commission's suggestions for review and realignment of national policies in three areas: price regulations, regulations governing biotech experimentation, and product quality and intellectual property issues.

Through the conceration activities, the EC biotechnology program is closely coordinated and harmonized with the extensive EUREKA commercial biotech programs.

Other programs still in the planning stages or just now getting underway in the area of biotechnology are: BRIDGE (Biotechnology Research and Innovation for Growth in Europe), dedicated explicitly to industrial product applications, SAID (Stimulation of Agro-Industrial Development), and ECLAIR (European Collaborative Linkage of Agriculture and Industry Through Research). Both SAID and ECLAIR are downstream, applied research and development programs aimed at increasing agricultural productivity and improving the distribution structure.

BRIDGE, among these new programs, will have the only significant component of basic research, and will aim for increasing linkages between university and industrial research. The four-year (1990-94) program is still being formulated, but a 100 million ECU ($112 million) budget has been drafted to cover four major areas of inquiry: data processing infrastructures and biological materials collection; technology development; multidisciplinary agricultural and industrial applications; and risk evaluation and identification of standards.

While continuing the research in plant genetics advanced through BAP, BRIDGE seems more likely to focus the largest part of efforts on animal and human biotech engineering. Nine principal categories of project support have been tentatively selected. They are: risk assessment; bioreactors; protein engineering; bioinformatics; microorganisms for industrial use; cultivable plants and related microorganisms; animal production and health; biotransformation processes; and pharmacology and toxicology _in vitro_.

Additional information concerning aims, specific objectives, and implementing mechanisms for the BAP can be found in Appendix 2, along with other documents covering Commission directives on BAP and BEP, SAID and ECLAIR.

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In addition to the Community's cost-shared, targeted contract research programs and the work performed by its one Joint Research Center, there are several categories of EC programs under the general heading of European scientific and technical cooperation. These programs are designed to reduce the bureaucratic and cultural barriers to cross-national research activities, to promote increased transnational educational, training and research opportunities in S&T, to develop standardized reference and information systems for researchers, and to encourage extensive university-industry partnerships in training and research.

The more important of these programs are described below.

STIMULATION

(Plan to Stimulate European Scientific and Technical Cooperation and Interchange)

STIMULATION began as an experimental program in 1983 designed to stimulate the levels of mobility, communication and integration among EC researchers necessary to put European research at the cutting edge of new technologies and fields of science through the synergy of human and facilities resources. In 1985, the Council decided to implement it as a four-year program, running through 1988.

STIMULATION was not designed to support particular fields of research, categories of industrial applications, groups of researchers or other definitive segments of EC science and technology. Rather, it had as its goal the transnational integration of European research and development activities, promoted through the funding of all forms of R&D, performed by all types of qualified organizations and researchers, across all disciplines of S&T.

The original aim was to involve 5% of all European researchers in some way in transnational collaboration. This was to be done through the voluntary transfer of researchers from one EC member country to another; the funding of joint projects which aggregate researchers from several countries; and the elaboration of communication and information exchange systems in science and technical fields.

Although proposals from any discipline, especially cross-disciplinary research, could qualify for support, those fields given particular consideration were: synthetic chemistry; biocommunication; earth sciences (new materials); integrated optics; mathematics and data processing; oceanography and marine sciences; surface chemistry and physics; and scientific instrumentation.

For the period 1985-88, the budget for the program was 60 million ECUs ($67 million). The program, unlike most others, was not a shared cost program. It was implemented through "multisectoral" incentives (transnational laboratory pairings, research grants, and operational facilities support) and "contextual" measures which encourage researcher mobility, organization of transnational career opportunities data banks, etc.

Exemplary of the types of technological fields benefiting from Stimulation funding are optical computers, gallium arsenide microchips and artificial intelligence. The last, under the acronym BRAIN (Basic Research in Adaptive Intelligence and Neurocomputing), is outlined below, providing a model of Stimulation programs.

> BRAIN is focused on the understanding of, and design of machines capable of emulating, the workings of the human brain in task-

oriented, problem-solving. This involves largescale, simultaneous information-processing capabilities, along with active reasoning and experience-based learning behaviour.

The scientific paradigm for such research is neurocomputing, which employs computers with architectures designed to simulate the human nervous system. It is a multidisciplinary field of research, encompassing cognitive psychology, information science, materials science and computer science, among others.

BRAIN is a two-year program (1987-88) with modest EC funding of 2 million ECUs. Six projects were chosen for funding in November 1987, involving universities and research centers in several EC countries. The projects are: associative memory models for artificial intelligence; learning in automated systems; neural networks for data processing; distributed matrix memories; temporal and spatial transformations in the brain; and graph-matching approaches for invariant perception. Funding for these projects totals nearly 1 million ECUs.

A detailed description of STIMULATION, along with details of the six BRAIN projects, is available from NSF/INT.

SCIENCE

The STIMULATION program has been superceeded by SCIENCE, which is an extension of the same types of activities supported under STIMULATION.

Launched in 1983 as a five-year pilot program, its principle objective was been the stimulation of transnational scientific and technical cooperation in Europe through financing of training and research exchanges for young scientists and the establishment of multi-institution, transnational research projects. In essence, it began as the human factors component of STIMULATION.

By mid-1987, SCIENCE had supported 346 joint projects, bringing together 2,550 research scientists in 950 different teams. Thirty-two of these projects have led to permanent research networks. Against the background of a STIMULATION objective of involving 5% of all European researchers in cooperation and interchange projects by 1992 in all its programs, the SCIENCE program had by 1987 reached a level of 0.6%.

A second phase extension of SCIENCE (1988-1992), designed to replace STIMULATION and budgeted for 167 million ECUs ($187 million), hopes to achieve a level of 1.5% of all European researchers in its projects by the end of the program. The second phase, like its predecessor, confines itself to covering the natural and exact sciences, but will likely be extended in geographic coverage to all the European Free Trade Association (EFTA) countries. It will focus on the fields of mathematics, physics, chemistry, life sciences, geosciences, scientific instrumentation, and fluid/solid mechanics.

The program's methods of support, like those of STIMULATION, are: bursaries, grants and advanced training courses for individual researchers; laboratory twinnings (pairings) and facilities operations contracts; and contextual measures (regulatory measures and information exchange systems).

FAST

(Forecasting and Assessment in Science and Technology)

FAST, of which phase 2 is the recently-ended initiative, began in 1976 as an analytical research program to assess scientific and technological changes and trends in order to identify longterm implications for EC economic and societal health.

The principle areas of research are: relationships among technology, employment and work; transformation of service activities and technological change (the information society); strategic industrial systems (communications and food production & distribution); and renewable natural resources development. Much of the progress achieved in EUREKA and in the EC's biotechnolgy programs has been attributed to groundwork done under FAST.

FAST 1 and FAST 2 had a combined EC budget of around 13 million ECUs. It is a shared cost program with a major objective of promoting cooperation among European research centers specializing in technology assessment.

As noted in one State Deparment telegram:

> FAST 1 was an opportunity for experimenting with a research tool: prospective research as an instrument for identifying new priorities for European R&D. For this purpose, it promoted collective deliberation by about a hundred of the Community's research institutes on the long-term development of European science and technology. This work, conducted around three priority themes in the program (work and employment, the information society, biotechnology and society), has yielded around 100 research projects distributed throughout the scientific community.
>
> These showed that the community R&D policy inspired by the crises of the 1970's did not sufficiently anticipate the turn-of-the-century problems and that a re-orientation in European R&D policy was necessary... The FAST approach has given rise to new joint ventures. For example, FAST 1 results have been used to prepare a Community biotechnology policy; they have provided initial concepts for the ESPRIT program... FAST 2 has been given a more operational

character...designed to encourage the setting-up of ad hoc cooperation networks between researchers and users.

FAST 2 launched 38 research activities, of which 26 were carried out under contracts with 96 research team from 11 Community countries."

MONITOR

The Commission in mid-1988 adopted a proposal to create a large-scale program based on the work done in FAST 1 and FAST 2. Called MONITOR, it has three closely connected fields of activity:

- o SAST (Strategic Analyses in Science and Technology), which will perform strategic and long-term impact assessments of scientific and technological advances in specific, targeted fields of science or technology, industrial sectors or on a critical theme;
- o SPEAR (Support Program for European Assessment of Research), which is to fund research by independent experts on improving methodologies for evaluating research and technological development, including development of quantitative indicaors; and
- o FAST (Forecasting and Assessment in Science and Technology), which is an extension of the previous FAST programs and will cover assessment and forecasting regarding S&T themes and problems of a general or global nature, including the economic and social implications of technological development.

MONITOR will be a four year program (1988-92) with a total budget of 22 million ECUs ($25 million). The goal of the program is to develop for the Community a body of expertise and capabilities in these areas analogous to those of the Office of Technology Assessment and the National Research Council.

COMETT and ERASMUS

Distinct from but closely related to the Framework Programme, the Community has enacted several training and technology transfer projects. Two of these, COMETT and ERASMUS, are human resource infrastructure programs similar in aims, but focusing on slightly different targets while employing similar support instruments.

COMETT (Community Program on Cooperation Between Universities and Enterprises for Education and Training in Technology) is a four-year program begun in mid-1986. Its chief aim is "to promote a European dimension to cooperation between universities and [industrial] enterprises in training relating to innovation and the development of new technologies." Additionally, the program seeks to optimize training resources and to strengthen and diversify training at the local and regional levels.

COMETT is designed to initiate a European-wide network of regionally-based, university-private enterprise partnerships in training in advanced technology fields. It also promotes, through grants and fellowships, university-business personnel exchanges throughout the EEC. COMETT also funds the development and testing of adult, continuing education programs devised by industry-university partnerships. The program additionally supports the development of joint undertakings in hands-on training programs and multi-media training methods, with emphasis on training instructors and professionals from the business community.

Participation in COMETT is open to all companies, research institutes, and universities or affiliated organizations within EC countries; all training activities must be carried out within the EC. Financial, personnel and equipment support are all acceptable forms of participation. Cost sharing varies with the type of training project, but in no case does Commission support exceed 50% of costs.

During its first year, COMETT financed the creation of one hundred eight university/private sector transnational partnerships. Two-thirds of these are headed by universites, the other third by businesses. Most have a regional character, with transnational and multisectoral dimensions just beginning to emerge. The program in the first year financed over a thousand student training sessions; 73 fellowships for business executives or university faculty; 136 continued training courses in new technology fields; and 62 multimedia training projects.

COMETT'S budget for 1986-1989 was 45 million ECUs ($50 million), estimated to be sufficient to fund 12,000 individual projects.

ERASMUS (European Action Scheme for Mobility of University Students) is a three-year program just implemented in 1987. Its goal, the internationalization of European higher education, is to be accomplished through the financing of transnational student exchanges and the formation of cooperative instructional programs between universities in various Member states. Its specific objectives include a program of student and faculty exchanges; mutual recognition of diplomas among countries; and development of integrated transnational curricula.

Program costs have been funded at 85 million ECUs ($91 million) for the three year duration of the first stage, broken down as follows: 11.2 million ECUs for 1987-88; 30 for 1988-89; and 45 million for 1989-90.

During 1987, ERASMUS financed 398 cooperative inter-university projects involving 850 institutions of higher education; granted 3,000 student mobility fellowships; financed 1,100 teacher and researcher exchange visits; and supported the implementation of nearly 400 common curriculum teaching programs. Fields receiving most attention are languages, management and the engineering sciences.

SPRINT and other Innovation Programs

The EC is pursuing activities to encourage innovation in science and technology through several small programs, the largest of which is SPRINT. This program covers a wide range of initiatives designed to uncover problems to, and design and implement solutions for, obstacles to innovation. Among these is the establishment of a technology watch system, EuroTech Alert and the Icone data base, which is an index of European and international technical standards. SPRINT's budget for 1988 was 8.6 million ECUs ($9.6 million).

Other small programs targeted on technology transfer focus on clean (eg., non-polluting) technologies (NETT), telecommunications (STAR) and new energy technologies (Valoren). The last two are specifically intended for lesser developed EC countries, designed to help speed their communications and energy infrastructure development to a level with the rest of the Community.

EUREKA

EUREKA, while not a European Community initiative, is intimately linked to a wide variety of EC programs and is supported by the EC, as one of the 19 members of EUREKA. The program was adopted in July of 1985 at the European Technology Conference and was the concrete expression of a French call made by President Mitterand in April of that year for a "technological renaissance of Europe."

Initially viewed by most European governments and private enterprises with reservation, as a French attempt to divert European participation in American high-tech programs (most notably, SDI), EUREKA has established itself as the primary vehicle for transnational cooperation in developing targeted products for commercial markets.

There are no specifically-defined technological fields for cooperation, and the scope of EUREKA projects covers everything from artificial intelligence to new tanning systems. New projects proposed for cooperation are simply required to include at least two industrial enterprises from at least two European countries. These enterprises furnish their joint proposal to the EUREKA coordinators in their respective countries, who choose to approve the proposal and forward it to the joint secretariat.

Other EUREKA member countries have 45 days to review the project and decide whether any firms in their countries wish to participate. Finally, the project is submitted to a semiannual EUREKA ministerial meeting for final approval.

Each participating country provides financial support to its own participating firms. There are no guidelines for the amount of support, though it generally varies from 15% to 50%. Thus, there is no common EUREKA budget; rather, there are budgets for individual projects, decided upon jointly by the participants and based upon how much each wishes to contribute. Governmental involvement, therefore, is largely indirect in shaping the scope or direction of EUREKA. Division of labor, industrial and intellectual property rights, and commerical exploitation are all issues to be negotiated beforehand among the participating enterprises, without governmental interference.

EUREKA's permanent secretariat, located in Brussels, is small - a Director (Xavier Fels, who is French) and six professional assistants.

By late 1988, the total number of transnational projects funded through EUREKA had risen to 213, with a combined funding total of 3.8 billion ECUs ($4.25 billion), incorporating nearly 800 participants, of whom two-thirds are industrial partners. This represents, on an annualized basis, roughly half of the level of investment eventually projected for EUREKA.

The Community has endorsed EUREKA and participates in EUREKA projects having a pre-competitive character where there is a community of interest. The EC also contributes to the success of EUREKA projects by way of the evolving framework of institutional mechanisms, the thrust of Community-wide research and training programs, and the implementation by 1992 of a truly common internal market in both goods and human resources. One of the more important contributions of EUREKA to the EC's European Technology Community lies in providing a forum for joint participation of EC organizations with those of the European Free Trade Association (EFTA: Austria, Iceland, Norway, Sweden and Finland).

The Community intends to strenthen its ties to EUREKA through a number of means, as was stated in an EC Press Release in June, 1988. The Commission has identified five areas of increased cooperation: 1) establishing greater complimentarity of EC and EUREKA programs to ensure continuity from basic research to technology development; 2) helping to finance precompetitive EUREKA projects; 3) devising new possibilites for direct EC participation in EUREKA; 4) mobilizing private financing and providing risk insurance to some EUREKA projects; and 5) improving the economic and business environment by moving forward rapidly on completing the internal market and working to remove barriers between the EC and EFTA.

A listing of current EUREKA projects with all pertinent information is available in INT, as is a document describing in some detail the linkages between the Commission of the European Communities and EUREKA, including a listing of links between EUREKA projects and EC programs.

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EUROPE 1992: POLICIES AND DIRECTIONS FOR COOPERATIVE S&T

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EUROPE 1992: POLICIES AND DIRECTIONS FOR COOPERATIVE S&T

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SUMMARY: Scientific and technological integration is occuring within the European Community (EC) apart from, but parallel to, the 1992 plan for a fully integrated economic base - the "Single Market." The issues and forces driving economic integration, and its social components, apply equally to the realm of S&T. The Commission of the European Communities (CEC) has taken the lead role in this area with its FRAMEWORK Programme of multinational applied R&D, which began in 1985. It is currently moving to implement research programs at the basic science level, an area traditionally reserved to the member state governments for funding, resource allocation and policy.

Significant differences exist among the member states over the preferred, or even tolerable, extent of EC responsibility for basic research. Several countries, particularly the smaller ones, appear to welcome the EC role as a stimulus and increment to their own research base. A few, however, are ambivalent about or unambiguously opposed to sharing control with the Commission at this level of science. However, Commission groundwork for such a role is well-advanced, and an extension of its policy and funding involvement is all but assured.

Several alternatives exist to EC leadership in pan-European integration of basic science; however, none of the candidate organizations is sufficiently strong, adaptable or prepared to take on such a role. In any event, Commission planning is so far advanced that a serious attempt at "rallying the troops" behind any alternative organizational scheme would probably collapse early on.

The effects of S&T integration on both the United States' S&T structure and the traditional pattern of bilateral U.S.-European S&T linkages cannot yet be predicted. It seems unlikely that a "Fortress Europe" will emerge with significant restrictions on access to and participation in S&T. Yet, if S&T integration is successful, the impact on the United States will be considerable in such areas as: S&T cooperation and exchanges; resources and knowledge acquisition; technology transfer and control; and high-tech competitiveness.

SCIENCE AND THE SINGLE MARKET: MERGING STREAMS

The European Community has set 1992 as its target year for the full economic integration of the twelve nations making up the Community. Integration holds different shades and degrees of meaning, depending upon the speaker of the moment and the policy aims of individual governments, but at its most basic it envisions the elimination of all barriers to the free movement of people, goods and finance and to the non-discriminatory treatment of these among EC countries.

The Commission of the European Community (CEC), the executive arm of the EC, has identified 279 laws, regulations and other objective barriers which it has targeted for dismantling by 1992. About half of those have already been dealt with successfully; however, a number of the remaining ones are politically contentious, many of them striking at the heart of traditional interpretations of national sovereignty. Nevertheless, it is quite likely that the EC of 1992 will be significantly more integrated in appearance and substance than the Community of the early 1980's.

Traditional scientific research in Europe has always incorporated a strong international dimension, much more so than business affairs and socio-political culture. For example, the evolution of modern physics, centered in Germany in the first third of the century, rested on the mobility and interaction of researchers from all over the continent, as well as from the U.S. Most international scientific societies still are headquartered in Western Europe, and with strong support from America, European scientists have remained at the forefront of efforts to protect the openness of scientific exchanges and dissemination of findings.

These two currents in Western Europe - economic integration and scientific freedom - are not necessarily related, and at times may embody contrary impulses. This divergence of goals becomes especially important with the increasingly dominant role of high-technology manufacturing as one of the two (with financial services) economic drivers of the industrialzed world. Technology applications are already widely understood to be linked intimately to innovation and productivity in the commercial sphere, and hence to national economic competitiveness. Increasingly there is a tendency, most pronounced on the part of those charged with managing or leading national economies, to extend that linkage along a continuum into the realm of basic science discoveries.

Thus, in the context of the European Community and 1992, the scientific community consistently stresses that progress in scientific interaction in Europe is, and always has been, distinct and pursued separately from the social and economic integration currently being implemented through the EC. However, the tenor of remarks by senior government and business leaders indicate assumptions that the evolving EC integration must certainly incorporate a significant science and technology element. Both groups are correct. The question is how far can these two integrative, international streams run parallel without the stronger subsuming the weaker in its own directional flow.

The removal of barriers to the mobility of researchers and research financing, as well as the optimum concentration of these resources, will certainly encourage the development of large-scale, international research parks as well as R&D consortia and other modes of multinational research concentrations. The standarization of regulations governing product development, distribution and sale, along with the elimination of discriminatory pricing policies, will eventually lead to large market economies (civilian and military) which have a pull-effect on research and development activities. In reality, S&T progress in Europe is being affected intimately and strongly by the coming Single Market, distinct from any steps taken by the scientific community to coordinate or encourage transnational research collaboration.

Despite this obvious connection, senior government S&T officials in several of the larger EC member countries are emphatic that their national programs, and the continuation of bilateral S&T cooperation with the United States, will remain relatively unaffected by the maturing of the Single Market and the consequent growth of CEC-funded and targeted research activities. However, in only one country - Great Britain - does government policy effectively work to discourage an expansion of EC-funded research opportunities which might overlap or compete with national programs.

STATUS OF AND PLANNING FOR COMMUNITY-FUNDED RESEARCH

Collaborative or cooperative national research can be traced to CERN (nuclear research), founded in 1953; ESRO and ELDO (space research), established in 1962 and later merged into ESA; and the Airbus Industrie consortium, which was formed in 1970. Within the Community context, collaboration began in coal and steel (ECSC) in 1955, in nuclear research (EURATOM) in 1958, and COST (see p.9) in 1971. It was not until the aftermath of the 1973 "oil shocks," however, that direct EC research efforts were extended to non-nuclear energy sources, raw materials and the environment, with research conducted primarily in-house through the Joint Research Center (JRC). The early 1980's saw a burgeoning of fragmented programs in major technological areas and brought into focus the need for an umbrella planning and coordinating structure, which was established in 1984 as FRAMEWORK. This mechanism incorporates all EC-funded research not performed by the JRC.

The legal foundation and executive authority of the Commission in executing such a broad-based research program were unclear, as the Treaty of Rome made no direct mention of or provision for science and technology. It is only recently, with the 1987 implementation of the Single European Act modifying the Treaty of Rome, that the Community imposed upon itself a legally-sanctioned obligation to "strengthen the scientific and technological basis of European industry and encourage it to become more competitive at the international level."

Carried out largely through the the FRAMEWORK Programme, previous and current R&D activities have been focused on fields of research requiring widespread European participation for their success and promising equally widespread benefits, in such fields as medicine and health, environmental protection, agriculture, energy production and communications.

The EC research program for 1989 accounts for about $1.6 billion annually, representing roughly 4 percent of public sector civil R&D by the twelve member countries of $39 billion (1989 estimate). This represents only 3.2 percent of total publicly-funded R&D, or around 1.7 percent of total R&D (public and private), in the EC 12.

For another measure of comparison, the EUREKA Program - which is industry-led and targeted on commercializable products and services - is capitalized at around $3.4 billion, with spending of $1 billion per year. It is obvious that funds for Community programs are not remotely comparable with the levels of research spending devoted to their counterpart national programs, where per capita civilian R&D in the four major member states ranges from eight to seventeen times greater than the total of Community spending.

However, Community-funded programs are beginning to accomplish two things of great importance to the strength of European technological competitiveness and which individual national programs cannot do. The first is to aggregate the scientific and technological resources of Europe in multinational projects, thereby eliminating some duplication of research costs and benefitting from the synergistic effects of such collaboration. The second is to provide impetus to the lowering or elimination of technical barriers to competition and trade within Europe, consequently reducing the advantages held by American and Japanese high tech firms in having large and technically homogeneous home markets.

The EC program is directed to the support of applied technology research and pre-competitive technology development. By far the largest components of EC-funded R&D under FRAMEWORK are nuclear energy research (20 percent); telecommunications and information technologies (40 percent);industrial modernization (16 percent); and health and environment (7 percent) of which only fusion research has any significant component of fundamental science.

However, the Commission has recently announced a new component of the information technologies program ESPRIT II which will focus on basic, pre-applications (ie., just downstream from fundamental) research. Approximately 5 percent ($75-80 million) of the ESPRIT II budget over the next two and one-half years will be fenced for this area of research activity, which will be performed principally by university (74 percent) and public research institute (20 percent) investigators. Proposals for funding will be peer reviewed by an ESPRIT II Advisory Board, which will select those to be supported. The Commission will provide up to 50 percent of actual research costs in each case, including 100 percent of non-overhead costs. As of March 1989, 62 proposals have been approved in superconductivity, optical computing, neurocomputing, advanced software, robotics, and speech and image processing.

With the coming draft revision of the FRAMEWORK II Programme, scheduled to be completed by the end of 1989, the Commission seems likely to advocate to the EC Council of Ministers the adoption of a large and concerted Community effort in basic research. Proposed funding is around $7 billion over the next five years, and it will likely be targeted on such fields as neural computing, new materials and basic biotechnology. The current program through which basic research is sponsored is the SCIENCE (formerly STIMULATION) program, which funds basic research indirectly through fellowships and other forms of support for laboratories and individual investigators engaged in transnational collaboration. Larger-scale funding will require a new mechanism to incorporate, replace, or at least co-exist with, SCIENCE. There is speculation, and a good bit of advocacy, that the basic research funds may be used to underwrite a portion of the operating costs of such programs as the VLBI (Very Long Baseline Interferometry) Consortium and the European Molecular Biology Laboratory, which are experiencing difficulties in raising private and national government funds. However, the potentially most contentious instrument of basic research support - direct grants - does not appear as a serious possibility in the near future.

The proposed basic research program is designed, according to sources in the CEC, to sponsor research which should be undertaken in Europe but which is not being funded through national programs. It will also provide incremental support to programs which are supported insufficiently by national research programs. According to senior Commission sources, this program would not overlap - at least initially - research already being undertaken or planned by national funding agencies. For the first time, however, there may develop a small degree of competition with national programs for resources in selected research fields.

The CEC is involved in several other ways in encouraging a more coherent research environment within the Community. Although member state policies and procedures control participation and procurement in nationally-funded work, the EC is attempting to coordinate the types of local incentives offered to attract and support research with potential commercial utilization. It is also wrestling with the topic of fairness in public procurement, initially by determining whether R&D should be treated as a service or a product. Work in the STIMULATION S&T infrastructure program, as distinct from the directed research programs in FRAMEWORK, has been focused on securing freedom of mobility and equality of treatment for researchers and other professionals throughout the Community. And finally, the EC is moving toward legislation regulating the importation, transport, and disposal of research materials. All these efforts are designed to level the playing field for competition over R&D resources within the Community.

MEMBER STATE RESPONSES TO EC BASIC RESEARCH INITIATIVES

Member state S&T agencies are only just beginning to recognize the extent of Commission planning for involvment in basic research activities. No strong poles of support or opposition have yet developed publicly; however, there are signs emerging of strong, vocal dissent in some quarters.

In general, the smaller countries have supported EC-initiated R&D programs because they incorporate the smaller nations' research units in large-scale undertakings which promise both technological spinoffs and researcher educational opportunities which go beyond the indigenous capabilities of those countries' S&T bases. The larger countries - West Germany, France, Italy and the UK - perceive relatively fewer benefits, due to the tremendous difference in resource scale between their national programs and the EC programs. Thus these countries have, on the whole, looked to EC-funded S&T as a tolerable, but necessary, component of economic integration or as extensions of mainline national programs, such as nuclear energy research. [78 percent of public sector R&D in the Community is supported by the three largest countries, while the six smallest spend only 6 percent collectively of the total.]

Even such large and successful EC programs as ESPRIT (communications and information processing), RACE (telecommunications infrastructure and network applications), EURAM (industrial innovation), and BRITE (new materials processing) have been perceived mainly as opportunities for smoother multinational interfacing of government-stimulated national research activities which would have been funded anyway.

To date, conduct and support of basic research has been strictly a national government prerogative. Policy coordination concerning basic research - with the exception of STIMULATION activities - has therefore been a bilateral matter. This state of affairs must inevitably change should new basic research programs be funded out of the Commission. The Community, through its own SCIENCE program and working with the European Science Foundation, already has undertaken substantial efforts in research networking and is instituting a program to coordinate multinational access to national research facilties. The CREST (the Commission's strategic research planning group) has entertained suggestions to study the feasibility of a joint European scientific instrumentation policy.

Assuming adoption of the proposed EC basic research program, the gross amount of basic research funding available from the CEC on an annual basis will be tiny in the overall European public civil R&D pool ($1.4 billion out of $32 billion). However, it promises significant advantages in leverage. It will be targeted on a relatively small number of advanced research areas identified by a European-wide body of scientific advisors; it will support primarily non-fixed-overhead research costs, giving it inherently greater flexibility and short-term commitment; and it will in many cases be leveraged with national funding to provide the incremental margin necessary to initiate or sustain particular research projects.

These factors of funding mobility will accrue to the CEC program funds an influence out of proportion to their actual amounts, and are likely - apart from other attractions of European integration - to engender a strong pro-EC stance among segments of the European scientific community. To the degree that limited national government funds for basic research must be channeled increasingly to maintenance of salaries, equipment, and facilites, CEC-funded programs in some key research areas might actually be able to compete for researcher attentions on a relatively even basis with national funding priorities.

Public research budgets for fundamental science throughout the member states are strained and are unlikely to rise significantly in the coming years; there has been an especially severe decline in inflation-adjusted basic research financing in the UK. However, absent a policy change at the highest levels of the Community, EC funding in this area may well increase substantially over the next decade. According to senior CEC officials, S&T is supported principally through a diversion of 1.5-2.0

percent of that portion of the Value Added Tax (VAT) collected by the EC countries which is allocated to the Commission. With the coming of a more efficient, consolidated single economic market, prospects are good for a healthy increase in this VAT income. Moreover, there is speculation that a sizeable portion of the savings from a streamlined Common Agricultural Policy may be pumped into Community R&D, rather than being returned to national government treasuries.

The British government has reacted to this situation by making known its strong opposition to any expansion into basic science of the Commission's scope of research management and support. The Thatcher government, while generally in favor of present Community R&D targeted on technology applications, desires no dilution of British control over the level, content or trend of British basic science research. The government may eventually undermine its own position, however, by its policy of reducing national funding of research projects by an amount equal to project income received from the EC, at a time when government funding of basic research has been in a long period of decline which shows no signs of reversal. The promise of a growing EC funding base may well work to divide the research community from the government. The problem is exacerbated in that the publicly-supported research community, acting through the national Research Councils, (themselves subordinate to the Ministry of Education) has only an indirect voice in government research policy and resource debates.

In West Germany, the Bundesministerium fuer Forschung und Technologie (BMFT), the federal government science ministry, has indicated only modest interest in Commission planning for a basic research program. While they foresee a near doubling of funding for all EC-supported S&T activities through 1990, their international focus is overwhelmingly on big science programs outside the Community structure or on the major applied technology programs of the EC. BMFT officials are moderately enthusiastic about new Commission programs in S&T which target such hurdles as language competence, job security, transferability of credentials and other issues of mobility. They do not, however, view Community planning efforts in basic research as likely to succeed, as viable, or as competitors for funds and scientific resources.

The Deutsche Forschungsgemeinschaft (DFG), which supports 50 percent of university basic research in Germany and consequently is more aware of the Commission initiative, downplays the importance of Brussel's potential as a source of funding and programs. Officials there explain that German researchers as a rule do not look to the EC and that those who do find the "red tape" to be a strong disincentive. While recognizing the inevitability of growth in CEC basic science programs, DFG officials believe that German research programs will be relatively little affected by them.

Another major voice in the success of any Commission plans, the French Ministry of Research and Technology (MRT) seems quietly supportive, but nevertheless wary, of expanded Commission activities focused upstream of applications technologies. The French view EC basic research programs as a potential way to leverage French financial resources more effectively at a time when the French government is elevating the status and funding - in the national context - of advanced technology research. The objective seems to to be that, in supporting Commission leadership in the types of activities necessary to promote and coordinate "internationalization" of basic research resources within Europe, Paris can more effectively target national funding on applications and development work in new technologies.

Overall, the Commission's planning for basic research sponsorship seems (on the surface) much farther advanced than are the reactions of the larger member countries, either in assessing its potential impact on the current system of support and management or in preparing responses to the CEC initiatives. Senior S&T officials within the Commission are very much aware of the leveraging influence of Community programs under the present FRAMEWORK plan, and they are keen to use that influence to spark a faster pace of transnational integration in research fields where there appears (to them) to be insufficient or duplicative allocation of national resources.

ALTERNATIVES TO COMMISSION DIRECTION OF COOPERATIVE S&T

The chief alternatives to CEC planning and direction of pan-European cooperation in a wide range of basic research fields are the ESF, COST, and the Council of Europe. Each of these is, or has been, successful at spurring multinational cooperation and - to some degree - integrated planning among Western Europe's scientific establishments. None of them, however, are structured or institutionally prepared to accept a dominant, aggressive role in melding Europe's research, much less to counterbalance the momentum and determination of the Commission.

The European Science Foundation (ESF), a non-governmental grouping of 49 government and private research councils and academies in 18 European nations, limits its activities to sponsoring and providing administrative oversight to voluntary cooperative projects in basic research among its members. The ESF staff is small, as is its budget which totals about $4 million annually (1987), and funding for specific project work is provided directly by member organizations which choose to participate in specific projects. In essence, the ESF will remain a minimalist structure for encouraging European-wide coordination of policies and funding resources in basic research areas of general European concern. Given its limited resources, low public visibility and narrow constituency, the ESF appears to recognize that its best opportunity for survival is to carve out its own niche within the expanding terrain of the EC.

COST, an abbreviation of European Cooperation in the Field of Scientific and Technical Research, is an association of 19 nations in Europe providing a legal umbrella for shared-cost R&D in basic applied scientific and technical areas. It was established at the suggestion and with the help of the Council of the European Communities in 1971, predating the 1974 adoption of a Community S&T program, in order to permit multinational cooperation in Europe, on an ad hoc, project-specific basis, beyond the confines of the EC. COST is not an independent, legally-established body, and it has no commonly defined research policy.

In essence, it is a vehicle for non-EC European participation in Community R&D, as well as a structure for international European cooperation outside the confines of EC S&T policies and programs. Due to the predominance of EC member state representatives in COST project selection and participation, as well as the close relationship between the Committee of COST Senior Officials (COS) and the EC research ministers and Commission chiefs, it is hardly feasible to consider COST as an alternative to expanded EC S&T activities. As a Council-dominated body, however, it may fulfill a role within the EC in balancing the Commission's move to further centralize the strategic management of European R&D.

The other major potential leadership role lies with the Council of Europe(CoE). The CoE functions as a pan-European deliberative and advisory body, but without the legislative and executive authority endowed to the EC. The CoE has no similar powers vis-a-vis national governments, but it can and does draft international conventions to submit to those governments for ratification, which subsequently become binding as international law on those states which have signed.

Its role in S&T matters is to identify issues or topics which have widespread implications for Western Europe as a whole, to define parameters for discussion, and to offer recommendations for action. The potential usefulness of the CoE lies in its ability - as a deliberative body without executive authority - to stand back from the contentiousness of debate within and among Community structures while providing a long-term perspective and steadying influence on the wider public debate. However, as a body capable of conceiving, implementing and coordinating a coherent plan for the integration of European S&T resources and capabilities, the CoE is lacking in institutional strength and authority.

EFFECTS OF EUROPEAN INTEGRATION ON U.S. SCIENCE & TECHNOLOGY

To keep the foregoing discussion in proper perspective, one must keep in mind a number of important points before drawing conclusions about the effects of evolving European integration on U.S. science and technology.

- Wide variations still exist among EC members with regard to R&D investments, quality and distribution of resources, shares of public and private sector funding, and government S&T policies;
- Resource levels, information flows and researcher mobility all remain far below normative patterns in the United States, despite significant improvements in all these areas in the last half decade;
- The United States remains, almost universally in the perceptions of European researchers, the most desireable location for study and research abroad, and European S&T administrators believe that flows of European researchers to the United States will remain strong over the next decade;

- The major emphasis in international scientific exchange among the larger countries of Europe still rests on bilateral programs, and relationships with the United States continue to rank at or near the top of priorities.

These observations are intended in part to allay perceptions that European integration implies a major threat to existing bilateral relations with the United States in science and technology. Nevertheless, the success of the Single Market momentum in provoking European researchers and their program administrators to look inward, in search of a cooperative synergy, may have potentially negative effects on the traditional pattern of U.S.-European interaction and the associated mutual benefits deriving from it.

Bi-lateral ties: The growth of a "European spirit" among young researchers, abetted by the public mood in general (which is heavily supportive of the concept of the Single Market), will inevitably put pressure on resource administrators to allocate an increasing share of research resources to intra-European Community undertakings: grants, fellowships, equipment, travel costs, and other "concertation" activities. Moreover, a steady rise in effectively-leveraged Commission funding, at a time when member state financial resources for S&T are directed predominantly to technology applications, will provide significant additional incentives for intra-EC "twinnings," joint research projects, faculty exchanges, and other types of cooperative ventures. The result may well be a lessening of commitment in some countries to maintaining current levels of sponsored S&T interaction with the U.S. research community.

U.S. resources and knowledge acquisition: The demographic problem of an inadequate pool of potential science and engineering talent in Europe is at least as severe as in the United States. Emphases and programs to attract students to S&T careers, and to motivate post-docs and young professionals to remain in Europe, are at the top of Community priorities. Strong efforts are being designed and implemented to remove barriers to and coalesce national efforts in pursuit of this goal. Success here may be reflected in a gradual reduction of European scientists and engineers who study, teach and work in the United States. A resulting diminution in the levels and frequency of international contacts would further complicate the problem of familiarizing American researchers with European S&T activity.

Technology transfer and cooperation with East Europe: There exists a general willingness within the EC to consider including East European nations within the framework of European cooperation in S&T. Such cooperation is already established with Yugoslavia, which has been a member of the COST consortium since the early 1970's. The EC has negotiated an S&T agreement in the past year with Hungary, and has opened discussions with East Germany and Poland on S&T exchanges. Moreover, the effects of Soviet glastnost have caused the S&T community to see major scientific and potential economic benefits to be gained from cooperation with the USSR and its East Bloc allies. Inclusion of these nations in EC S&T programs like ESPRIT II and BRITE/EURAM would automatically dilute technology transfer controls in related areas of R&D. The effect on U.S.-European S&T cooperation would be to complicate seriously both information and personnel exchanges in fields with national security applications, especially at the program level and involving researchers who might participate in joint research.

International competitiveness: On the topic of a developing "Fortress Europe" in trade, finance and technology applications, senior European S&T officials have stated consistently that such protectionism is neither developing nor desireable. Quite independently, however, the lowering of technical and economic barriers, the mobility of capital and human resources, the creation of larger-scale markets, and the concentration of development, production and marketing capabilities, will all strengthen the Community's competitive base. The impetus to consolidation and avoidance of duplication of member state S&T resources may, in the public sector, bring about greater efficiency in the utilization of those resources. Guided efforts to identify and spur linkages along a continuum from basic research to technology development may bring about, through such means as EC-EUREKA interfaces, a quicker and broader transfer of knowledge from the discoverer to the product developer. All of these may have a cumulative effect of making Europe a stronger competitor to the United States in economic terms.

CONCLUSIONS

It will not be realistic within a few years to view S&T relations with EC member states solely, perhaps even primarily, on a bilateral basis. Even in the Council of Ministers, which embodies the national self-interests of the individual member states (or at least their dominant political parties), sentiment is for real integration - only the pace and degree are at question. Apart from increased funding, the principal need for European basic research is the removal of barriers to access: to facilities, to equipment, to young researcher talent, to information. Concomitant with access is a need to aggregate these resources structurally and in locations which utilize them most effectively - toward synergy and away from duplication and redundancy. Dealing with these needs is where the EC Commission's strengths lie, for success in meeting them depends not so much on money as on the achievement of a multinational concensus.

The Commission's S&T bureaucrats have moved carefully and quietly to take maximum advantage of the opportunities offered by this current of feeling. They have demonstrated over the past half-decade that EC-sponsored R&D can work to achieve levels of cooperation and results among countries and among firms which was not hitherto attainable. Their programs have produced, or show strong promise of delivering, commercializable technologies which can compete favorably with American and Japanese competitors. The Commission has gained the confidence of the scientific community and the larger public in pursuing its mission to raise the overall quality of S&T in the Community while utilizing scare resources effectively.

Relative to the national governments, the Commission holds greater promise for increased funding of research at the individual investigator level - as opposed to applied technology development, where national funding is increasingly directed. Commission-funded basic research is bound to encroach on traditional national government perogatives, and rather than a strict demarcation of Commission-member state responsibilities, there is likely to emerge a moving compromise, with the EC gradually extending its reach into basic research through infrastructure support and cost-sharing with nationally-funded projects.

If the United States S&T community - researchers, technology developers and product marketers - is not to be left at a disadvantage in maintaining its traditional access in Europe, due to inadequate understanding of and preparation for the processes now occuring, it must accept that EC cooperation in science and technology is moving decisively toward a significant degree of integration. Moreover, the development of a policy framework within which this access must be secured should move quickly and coherently to focus on the opportunities for expanding transatlantic cooperation and to initiate constructive dialogue with the Commission about developing those opportunities. This will require dealing with Western Europe on a basis different in key respects from traditional patterns of interaction, not in place of bilateralism, but in parallel.

Washington, D.C.
May, 1989

The **Chairman**. I thank the gentleman very much.

Questions? Mr. Brown from California.

Mr. **Brown**. Dr. Moore, I have been reading a little bit ahead into Dr. Bradshaw's testimony. I hope you will forgive me if I raise a question which perhaps he is better suited to answer. But I was struck by the description of what you call the FAST and the MONITER programs, which seem to be efforts at policy planning in the technology field.

As you note, or as Dr. Bradshaw notes, there is a very striking resemblance to some of what we do in OTA, and possibly in NRC. I am interested in that process. I have talked to a number of Europeans who have come over here to look at OTA. I presume that they also looked at our other mechanisms for anticipating the future impacts of technology.

I wonder how they go about incorporating this in their structure as rapidly as they seem to have. Apparently, these are programs that have been going on for several years. I assume that they are evolving in the direction of policy planning, or what I guess the French call the "indicative economic planning," or they used to use that term.

I wonder if either one of you could discuss that a little bit more, because I get the impression that they are benefitting from our activities, our efforts to solve certain problems, and I am not sure that it is working the other way, that we are getting any feedback on how well these systems are working in connection with research and development within the European Community.

Dr. **Moore**. I will make one comment, and then I will ask Dr. Bradshaw to add something on the actual procedures that they are using. You mentioned the possible applications of what is produced by those programs. You suggested something about the French indicative planning.

I believe that that gets to a very fundamental problem within the Community, which is that of the relationship between the Community and its efforts, and the national sovereignty of the member states. And of course, some of the members have taken, one in particular, has taken a very strong position on that.

So I believe that it is far from certain that what comes out of those FRAMEWORK programs, or those Community programs, is going to result in a trans-national kind of a planning effort. I think that is a real battleground, that they will be fighting over in the next few years.

Do you want to comment on the actual procedures Dr. Bradshaw?

Mr. **Brown**. I apologize for jumping ahead, but I may have to leave, and this is an area of intense interest to me, since I have worked, as other members of this committee have, on the development of our science policy planning apparatus, going back into the '60s. We sometimes feel that it is not really evolving as rapidly as it should.

On the other hand, it seems to be doing some things right, because it is being copied. And it is a matter of great interest.

Dr. **Bradshaw**. Thank you, Mr. Brown. I think it is important to go back about 15 or 20 years in the history of European science and technology. At that time, European countries were not very much aware of what each other was doing. Their S&T structures at the bases, their capabilities, grew up independently.

With the formation of the science and technology function within the Community, it was acknowledged that they really did not know how to manage this process. They had no experience in interacting with each other. To the best of my knowledge, the FAST and MONITER programs have been directed not so much towards strategic planning and direction of the actual programs in the communities, so much as coming up with types of methodologies and ways of interacting trans-nationally, so that European researchers and the research administrators can know the capabilities of each of the countries within the Community, and therefore plan ahead 5, 10 years down the road towards what kinds of programs they can reasonably expect to undertake.

Mr. **Brown**. Well, I was struck by this process, and I would like to know more about it. I very much appreciate the contribution that each of your prepared statements makes to this, because frankly I think this committee has not been very well informed as to the intricacies. There seems to be a powerful mixing action taking place within the European scientific and technological community, being deliberately encouraged to overcome these national boundaries.

But going back to the earlier testimony from Secretary Shaw, he mentioned that there was an emphasis on energy efficiency and nuclear safety developing in the energy field there, and the market potential that this represented in terms of future developments in Europe and even outside of Europe.

We have had an on-again, off-again attitude toward energy efficiency and nuclear safety in this country. What I am seeking for is to see if there is a relationship between the FAST and the MONITER programs which apparently seek to take long-rage views on the impacts of new technologies, and their ability to focus on something as important as energy efficiency and nuclear safety as being a positive factor in their economic competitiveness, we would say over the next generation. Because I feel sure that, as a result of the growing concern about global environmental issues, that they have really hit a hot button there, and it is going to do a great deal for them.

We need to do the same thing over here. But we may not have the mechanisms to focus on the importance of these linkages.

Dr. **Moore**. Let me make one comment on your noting the mixing in Europe. I think you have hit a key point there. The two programs that strike me in this respect are the ERASMUS program and the SCIENCE program, both of which are designed to stimulate the exchange of students, on the one hand, and researchers on the other, from among the countries of the Community. I alluded to that in my mentioning of networks being built up throughout Europe.

I think, over the long run, this is a terribly important aspect of the FRAMEWORK program, one that will pay off in very strong dividends for the Community. Why they are focusing on nuclear safety and energy efficiency, whether that came out of FAST or MONITER, if it came out of particular country interests, I have to say that I do not know.

I think that you are right, that this is an area where they may be on exactly the right track for exactly the reasons that you suggested. Perhaps we can look into that question and provide additional information.

[Information to be provided follows:]

Response to Rep. Brown's Inquiry on the Relationship Of FAST and MONITOR to Long-Range Planning in Nuclear Safety and Energy Efficiency

The FAST program, and its successor, MONITOR, have been designed to perform long-range analyses of European S&T needs and resources, as well as their links to and potential utlization as factors in economic growth and social change. The connection between strategic planning and R&D in disciplinary fields illustrates the distinctively layered approach to Community R&D.

The planning assessments in various broad categories are conducted independently, but are used subsequently by FRAMEWORK program planners as guides for both individual program design and for coordination among related programs. The current Forecasting and Evaluation program, which incorporates the FAST successor, MONITOR, is a separate major budget function from that for Energy, which contains operational research sub-programs in nuclear fission and non-nuclear energy. The forecasting studies to be performed under MONITOR are part of an effort to provide an umbrella of coherence for both existing and future EC R&D activities. They furnish operational direction for future research and a methodological road map for intra-Community cooperation and resource utilization. They also, and not least in importance, tie S&T pursuits to present and emerging currents in Community politics, economics and sociology.

Strategic assessment, forecasting and planning functions for Community energy policy have a much longer history than the FAST programs, having been addressed in a number of policy guidelines issued by the Commission beginning in the late 1960's. A special Energy Committee was established by the Council in 1974, with Commission leadership, to coordinate the implementation of Community measures on energy. It was also to provide for information gathering and exchange and to assist the Commission in developing proposals for legislation and guidelines relevant to energy use. This Committee has remained the primary vehicle for Council-level consideration of energy issues, with the analysis and forecasting functions located in Directorate-General XVII under a M. Guibal.

According to Commission officials responsible for both MONITOR and FAST (which in its latest incarnation is a component of MONITOR), neither of the previous FAST programs ever worked directly on energy problems or issues. The new MONITOR program is just now being implemented, having been authorized by the Council in recent months.

The CHAIRMAN. Would the gentleman yield?

Mr. BROWN. Yes, sir. Certainly.

The CHAIRMAN. Mr. Brown is making an extremely important point, especially where you talk about energy efficiency. It is axiomatic. And I did not want to—what would you say?—ruffle the feathers here, when the previous witness was testifying on the Synthetic Fuels Corporation.

The Synthetic Fuels Corporation had a very, very significant purpose. And had we not been able to get some change that took place for all kinds of reasons in the supply of oil and so forth, we would have been in very serious trouble, to say the least. It is unfortunate it was not administered properly. I think that that is very common. But by the same token, energy is an input into production. You cannot put anything together without input of energy of some quantity and some quality.

So when they start speaking about energy efficiency—and we visited for example the COMEGA operation in France 6 or 7 months ago, that took our technology in the work they are doing on their high-level nuclear waste, which we have not even started. So I happen to think that with the energy efficiency issue they recognized that. And we are talking about eliminating other barriers so that they can become more competitive and therefore more, basically, more competitive. Energy efficiency is terribly important to their product capability, as it would be, obviously, in the United States.

So I would compliment the gentleman from California for recognizing that. I think that out of these particular hearings—we need more education; all of us do. But we have to start to set some significant policies. That is the key issue. I feel the same thing, there is a mix there. Something is stirring, and for the good of Europe. I am not quarreling with that point. But I am not so sure that what is for the good of Europe is also necessarily for the good of the United States, as far as competitors are concerned. At least this point in history seems to indicate that.

The gentleman from California.

Mr. BROWN. I thank the Chairman for his contribution.

Actually, I want to just pay tribute to the kind of work that you have presented here as an indication of what NSF can do. Bearing directly on broader policy issues here, which we need to explore much more fully, I know that NSF, before we had an OTA, was doing technology assessments, for example, at least on the basis of exploring the possibilities of this kind of policy analysis.

I think we need increasingly this kind of intelligence in order to shape our own national policy posture. And I am concerned about how we can get this kind of information to a broader audience, including an audience within the Executive Branch policy-making machinery. Then we may have succeeded in doing this.

I am not here assuming that this will lead to our copying the European system, or anything else. It is just that intelligent policymaking requires that we understand what is going on on a global basis, and be able to determine if this is helpful or not helpful. Can we learn from it? Can we modify our own processes to encompass some of the good things that may be happening here?

Dr. **Moore**. If I may just make one remark, be assured that the OTA reports are read with care and taken seriously in the Executive Branch. I have had experience with the biotech report and also the biodiversity report, just to cite two examples. They are excellent pieces of work, and they have played important roles in developing policy.

Mr. **Brown**. But the OTA operation is essentially an ad hoc operation which responds to the requests of committees of the Congress. It is not directed in any way, shape, or form, at fulfilling the needs of a national policy process—and maybe it should not. I am not arguing that.

But what it does fail to do is to give us the kind of an integrated picture that I think the Europeans are seeking to accomplish through the mechanisms that they have set up. And that bothers me a little bit. It may indicate a direction in which we ought to be looking.

Thank you, Mr. Chairman.

The **Chairman**. I thank the distinguished gentleman from California.

The Chair recognizes the gentleman from Alabama, Mr. Browder.

Mr. **Browder**. Thank you, Mr. Chairman.

Dr. Moore, I would like to pursue I think the direction that the committee has been pursuing, and maybe put you on the spot at the end. Your paper and the testimony of Dr. Bradshaw that follows outline some pretty extensive and impressive initiatives. But I notice a couple of comments that you have made, or at least that are in your text:

> "We may want to put significant effort at the federal level in exploring the opportunities which currently exist and attempt to expand them."

You also say:

> "We should begin now to reassess our approaches to protecting and advancing U.S. interests."

We have heard earlier this morning, regarding the federal role, that we are not sitting around. But on probing, we have been told that we are providing a nexus of information.

I would like to put you on the spot. In your opinion, are we doing enough? Or do you agree with that position that was taken earlier, that we are not sitting around, and we are providing a nexus of information? Is that an adequate response?

Dr. **Moore**. Are we doing enough? Probably not. That is an easy answer to give, but I do think that the challenge that is being set in front of us by what is going on in Europe is something that we are really just waking up to, essentially. And we need to be doing more.

What is NSF doing about it, ourselves? I mentioned the task force, which is a very serious effort. The Board consists of about two dozen very senior people from industry, from universities, that have a good deal of authority. I think that will be an important thing to do.

It is, I admit, a study. But it is a good idea to know where you are going before you start moving, and we need to have some direction of that kind.

I would make kind of a general comment about what I think we should be doing in science and technology, at least as seen from the National Science Foundation's point of view. We need to strengthen our own capabilities. That I think is number one. We can do as much as we want in terms of assuring access of U.S. researchers to science and technology in Europe as we want; we can get all of the guarantees of openness we want; if we do not have the capable researchers here to go and do that, it does not matter. It will not be of any use to us. If we do not have the research capabilities ourselves to train those people to have our own laboratories that can investigate new developments, we are finished. That is number one.

So that means education, and it means research. And in education, I would emphasize that we really need to be looking outward, besides developing people with technical capabilities, which we obviously have to do, I think we have to change our mindset, if you will, and think more in an international way than we may have been doing in recent years.

What is going on in Europe and what is going on in Japan is not something that is upon us today, but it is going to be on us for a long time to come. And if we forget about the fundamentals, we will be in big trouble.

We also should be doing all of the things that I think Secretary Shaw was referring to, and that is doing things to ensure access, to ensure fair treatment, to ensure equity for our researchers. And I would also point out that we have a lot of very good bilateral relations with these countries. I know that from NSF's point of view, and of course it is true from the national point of view. I think we need to strengthen those ties and encourage that, and we need to be watching what is going on over there and responding ourselves, and taking some initiatives ourselves.

Mr. BROWDER. Would you agree with the statement that at this point we do not have a comprehensive, coherent policy in addressing EC 1992?

Dr. MOORE. I am not sure what you mean by a comprehensive, coherent policy. If you mean that there is not a single statement that all of the agencies have signed on to, that is correct. I do not think that there is one. But in reading testimony and talking to various people in the Administration, I think everyone is recognizing what the threat is, what the problems are for us, and I believe are playing from the same sheet of music, as Secretary Shaw said.

The CHAIRMAN. Would the gentleman yield?

Mr. BROWDER. Yes, Mr. Chairman.

The CHAIRMAN. I want to get at that, playing from the same sheet of music. It is ironic. You were not here yesterday, of course, but the State Department testified, and the point that was indelibly made, you know, this is the science, research, and economic dynamics that we are talking about. It does not affect the military.

The question that some of the members had raised was, well, what kind of effect, if anything, will this have on NATO? Well, that really is not part of this issue. What we are really talking about is the united marketplace. And we are talking about the coordination, which is the discussion today.

Now, I think somebody would have to have a hole in their head, or whatever, being quite blunt about it, to talk about playing—I do not mean any disrespect to you—to be talking about playing from the same sheet of music, as your predecessor said, when the other part of the company tells us, "Hey, guys, it doesn't really affect NATO."

Now, there is no question whatsoever, in my mind and anybody else on this committee, that what we do economically is equally as important to the security of this country as are our bombs and guns in the NATO situation. I happen to think that this issue has an extraordinary potential impact on our whole relationship with Europe, and one would have to come back and say, "What are we doing this for in the first place, Europe, if we are not going to do it for a purpose?"

So if the purpose of Europe is to be more competitive, and they are taking over, along with the Japanese, almost every high level technology, including supercomputers and everything else, then we have got to understand that it is an extremely important issue, and that we get on it now and not wait for another three or four years until it is too late.

I think that the point that the gentleman raises is an extremely important one at this point. I just do not feel—and again, no personal affront to you whatsoever, or your colleagues—the Administration is not coming through to us as being coordinated at all, at this juncture.

Dr. MOORE. Well, let me just make—

The CHAIRMAN. One more point, if the gentleman would indulge me. One more point you have got to keep in the back of your mind. Some of the members have testified, some witnesses have testified—they misconstrued, perhaps, what the substance of the hearings is about. We are not just talking about science and technology, we are talking about how it plays into the picture.

Science and technology is not an end unto itself; it is a vehicle to an end. The end is productivity and security, and everything else. So the interest of what we are doing jointly and severally in science and technology, as it relates to the country's ability to participate in that marketplace, is the issue.

Dr. MOORE. Well, I would certainly agree with you that the economic security is fundamental to national security. I am actually, as you may know, an economist by training, and that is something that is an easy concept for me to handle. Certainly, I would say, it is even more true today than in the past that economic security equals national security.

I do not know the context in which the question was asked yesterday of the State Department representative, but anything that affects national security certainly affects our international security arrangements and, sure, there is a tie there. And probably it is true that the focus so far has been on what I might call civilian competitiveness. But I think you are right, that there are some very clear implications for national security, broadly seen. Among other things, there is export control.

The **Chairman**. Shouldn't the Administration be talking about a policy? What do we mean by "competitiveness"? What is the policy ramification of the interpretation of the word "competitiveness"? If you were to ask the 435 members in the House, you would get 435 different definitions. And I say that with the highest respect and regard for our people.

So I think, when we start asking the Administration, it is not just the idea of running around and doing this and doing that; but we ought to be saying, "What is the policy of the Administration?" It has nothing to do with partisan politics, as far as the broad-based ramifications of Project 1992 in Europe. What are we doing about it? That is the purpose of the hearing.

Dr. **Moore**. I could add a definition to the 435.

The **Chairman**. I have difficulty answering for one. But go ahead.

Dr. **Moore**. There was a definition actually that was proposed by the Young Commission some time ago, that is not a bad one. If I remember, effectively, it says to be able to compete effectively on an equal international playing field, while maintaining a steady or rising standard of living for the people of the nation.

I think that is not bad. If we can continue to increase the standard of living—and I take that broadly, by the way; not just because it includes such things as environmental quality—but if we can manage to continually improve the standard of living of our people, while competing effectively on an international market, assuming those markets are fair and open, that is not a bad definition of being competitive.

The **Chairman**. I must yield back to the gentleman, yield back his time. I am sorry to have interrupted, but I just wonder what the Green Party is saying in Germany vis-a-vis the point of view of what their interpretation of "environment" really means to them.

The gentleman from Alabama is recognized.

Mr. **Browder**. Thank you, Mr. Chairman.

I think you very adequately expressed my concerns, and I have no further questions. Thank you, Dr. Moore.

The **Chairman**. The gentleman from Missouri, Mr. Volkmer.

Mr. **Volkmer**. Thank you, Mr. Chairman.

Yesterday, I brought up the question which I think your testimony hits directly on, and maybe if my memory serves me right it may be a little bit in conflict with what we heard yesterday.

What I see occurring in the EC in relation to research is that we are seeing a kind of transition from each Community country having their own research and technology development, to an EC, basically, with a program type of research development. Correct, or incorrect?

Dr. **Moore**. I do not know. First of all, the simple answer at the beginning is, yes, there is more now than there was 10 years ago. Is it large? I think the answer to that is, at the moment, no, it is not large.

Mr. **Volkmer**. In relative terms, it is not; but it is there. Most of that, that is there, is basically more applied research than basic research.

Dr. **Moore**. Right.

Mr. **Volkmer**. And each one of those that they have, whether it is ESPRIT or RACE, or whatever it is, is aimed at specific technology development to help their economies.

Dr. **Moore**. Largely, that is true, yes.

Mr. **Volkmer**. That is basically the purpose of it.

Dr. **Moore**. That is right.

Mr. **Volkmer**. But now, we are seeing a fundamental drive—a drive for fundamental research, or basic research; correct?

Dr. **Moore**. There are indications that they would like to move in that direction, yes.

Mr. **Volkmer**. I see the same thing happening in Europe now as in the past few years, and I think it is going to develop further in applied research, as what I consider that Japan has done for the past 10 years.

Dr. **Moore**. In what respect?

Mr. **Volkmer**. In respect of specifically trying to target markets, whether those are internal or external.

Dr. **Moore**. Well, they are targeting particular broad areas of potential markets. What exactly falls out from within those markets in those broad areas I suppose remains to be seen, but in a broad sense, I would agree with you.

Mr. **Volkmer**. When we get to the NSF, how much of the total funds from NSF goes to basic research, and how much goes to applied research?

Dr. **Moore**. About 90 percent to basic, and maybe 10 percent applied.

Mr. **Volkmer**. In the past 8 years, have we not seen a severe reduction in applied research, government-sponsored, in this country?

Dr. **Moore**. Well, the answer to that is kind of complicated, I think. What has happened is something like the following. In the last 10 years, there have been two major kinds of shifts. One is in—I will say three.

First of all, there has been a very big increase in total federal support for R&D, research and development, going across the whole spectrum.

Mr. **Volkmer**. Eliminate military. Just talk about civilian.——

Dr. **Moore**. I am about to do exactly that. Military is now about 65 percent of the total. It used to be 50. Civilian used to be about 50, and now it is about 35 percent.

Within the civilian R&D budget, which has also grown by the way, there has been a shift from development at the one end of the spectrum in favor of basic research. And I believe it is true that applied research has stayed about the same fraction of civilian R&D throughout this period. But development has definitely gone down, very significantly.

Mr. **Volkmer**. And as far as government-sponsored what I call applied research, that has been reduced also.

Dr. **Moore**. I believe that the share of the federal civilian R&D budget going to applied research has about been the same over this period, from about 1981 to the present time. I think the share has remained about constant.

Development has gone down very significantly over this period.

Mr. **Volkmer**. Now, we see areas, do we not, in this country where we could have more applied research?

Dr. **Moore**. Sure. No doubt about it. Also, a lot of areas where we could have more basic.

Mr. **Volkmer**. I will not argue that, that we need to do more, especially in the civilian sector. I agree with that. But what I am concerned about is where I see the Europeans heading with the Japanese, or where the Japanese have been, a far as developing even industry for the sake of providing product for market, and trying to get ahead of everybody else. It appears that Europe is not only trying to catch up, but hopes to get ahead.

Dr. **Moore**. Again, let me make one short point, and one rather longer point.

The short point is, again, remember that the whole FRAMEWORK program is bout $1 billion a year, something like that. U.S. industry is spending about $65 billion a year on R&D, all kinds of R&D, including development. The federal civilian R&D budget now is about $23 billion. It is important, I think, to keep that FRAMEWORK effort in that kind of perspective.

The second point I would make is this. What I think we need to do, one of the things I think we need to do is to adopt policies that stimulate R&D spending by industry in the U.S. They are spending a lot now, and I think we need to encourage them to spend more, to invest more I should say.

Things like the R&D tax credit, things like antitrust provisions that might stimulate more research, looking at our regulation, at tax policy, et cetera. I think that policies that would stimulate R&D by private industry would be very much in our interest, and we should adopt such policies.

Mr. **Volkmer**. In other words, the Government should not have any increased responsibility in the area of what I call applied technology?

Dr. **Moore**. I think that is a government responsibility, what I just described.

Mr. **Volkmer**. But you are leaving it up to the industries to develop those areas which they see themselves as beneficial to them? That is what they are going to do.

Dr. **Moore**. Sure. That is right.

Mr. **Volkmer**. All right. Now that means—if I may, Mr. Chairman, I just want to ask the gentleman, because I do not know, and maybe we are doing something on this. I think that everybody recognizes, maybe not world-wide, that we have a problem with a thing called chlorofluorocarbons; correct?

Dr. **Moore**. Absolutely.

Mr. **Volkmer**. How much would you say is being devoted in the private sector for research into being able to use a product other than chlorofluorocarbons for refrigeration and other purposes?

Dr. **Moore**. I do not know the figure there. I do know that a number of chemical companies have developed some compounds that appear to be potentially very valuable in that respect and that could serve as substitutes for the CFCs; but I do not know the actual figure on the research.

Mr. **Volkmer**. But there is no directed effort to provide for a substitute?

Dr. MOORE. Directed by the Government?

Mr. VOLKMER. Or anyone.

Dr. MOORE. Directed by the firms, but not by any government agency. I think that the Montreal convention, and of course the subsequent modifications of that, have sent out a signal that could not be plainer, that these things are going to be gone, and if the chemical companies are going to survive they have to develop substitutes. And they are working very hard on that.

Mr. VOLKMER. How much research is being funded through NSF for substitutes, basic research into substitutes for CFCs?

Dr. MOORE. I have to say that we are not focusing on substitutes for chlorofluorocarbons. What we are doing is a lot of research in chemistry, the chlorine chemistry in particular, that provides a foundation for people who want to develop those substitutes. But we do not have a program that I can call CFC research.

Mr. VOLKMER. Basically, we are again relying on the private sector, because they recognize the fact that, in 5 or 10 years, or some time in that time frame, they will not be able to use chlorofluorocarbons in certain products.

Dr. MOORE. Yes, that is right. That is essentially right.

Mr. VOLKMER. And we do the same thing in other fields, where everyone knows that there is going to have to be some changes made in this country.

Dr. MOORE. Well, I would not say that we are doing that in all other fields. We have certainly invested in the SEMATECH consortium. We are putting money into HDTV. We can argue about whether there is enough there.

I think that in the National Institutes of Health, we are investing huge sums of money in research designed to develop cures for illnesses.

Mr. VOLKMER. I am talking about products for marketing. I am talking about competing with Japan.

Dr. MOORE. There is a whole pharmaceutical industry that develops products for marketing, that is another big area of competitiveness. And again, NIH is very much involved in providing the basic knowledge that is necessary for that industry. No doubt about it.

Mr. VOLKMER. Well, as one who has served on this committee through a time frame where I saw a lot more being spent, Mr. Chairman—as I remember, and maybe my memory is poor, but I will look at it again this year—for applied research and developmental research, what is being spent today through this committee, I have grave reservations about the policy that you have enunciated as far as research and development in order to compete with the EC and with Japan.

That policy I think is one that is not going to be able to compete in the future.

Dr. MOORE. Let me just reiterate, with respect to the civilian R&D budget, I want to make it very clear. I said the development has gone down very, very significantly over this period, civilian development, so that the sum applied research and development is probably a smaller percentage—certainly a smaller percentage today than it was at the beginning of the period. That was my statement.

Mr. VOLKMER. Thank you, Mr. Chairman.

The **Chairman**. The Chair recognizes the distinguished gentleman from Tennessee, Mr. Tanner.

Mr. **Tanner**. Thank you very much, Mr. Chairman.

I am sorry I was not here earlier when the gentleman from the Commerce Department testified. As I said yesterday, throughout this series of hearings that we have had on this committee this year, the attitude of the Commerce Department seems to be "Don't worry, be happy," the song.

Let me ask this question of Dr. Moore. You may not be the right one to ask this question to. Yesterday, I asked the question, what is being done to coordinate our efforts as a nation to interface with EC 92? We were told yesterday that the U.S. Trade Representative's Office was the lead agency in our dialogue with them. Do you think that that is the proper place for this effort to take place?

Dr. **Moore**. If you look at where the center of the effort is, it is the Economic Council itself, at the Cabinet level. The Trade Representative, the Department of Commerce, the Department of State, are all involved in that policy council, of course. That is one locus, and I would say the highest-level locus of attention to EC 1992.

The Trade Policy Review Group, of course, has been very much involved in this set of issues. I think, myself, that the matter goes beyond trade, and that we should be looking at—

Mr. **Tanner**. I cannot agree with you more.

Dr. **Moore**. The technical agencies, I would say, have been involved at various stages in the process. But there is not a separate structure or effort by the technical agencies. Maybe there should be. So far, there has not been.

Mr. **Tanner**. Throughout these few months that I have been here, HDTV, the FSX technology, LANDSAT, and so forth, every time it seems as if the Department of Commerce—if you will allow me, Mr. Chairman—they seem to think that we need to leave everything up to the private sector, and depend on the good will, initiative, and good heartedness, I guess, of a few private individuals to set our national policy. I think your comments really were right on target.

I am not sure that we realize the seriousness of what we are doing today, as it relates to the future. And forgive me, Dr. Moore, but I think the gentleman, Mr. Volkmer, was on point. I am not sure, Mr. Chairman, that we can continue to rely on the civic-mindedness of a few private individuals to set our national policy in this regard. That is just a comment.

Am I wrong about that?

Dr. **Moore**. It is not civic-mindedness.

Mr. **Tanner**. We seem to be saying not only do you in this country let the fittest survive and if you can make it, fine, and if you cannot, that is too bad; but no, we are almost telling our firms the same thing is true internationally. The Government—like the man said earlier, the gentleman—is the nexus of information. That is great. But I am not sure that that is good enough.

Dr. **Moore**. It probably is not good enough. But let me just make a remark for perhaps the leading example we have in front of us right now, and that is the European effort in HDTV. It is essentially a consortium or joint venture of three big European firms: Townsend, Phillips, and Bosch, plus their affiliated firms throughout the EC and a couple of other countries, plus a lot of affiliated smaller firms that are tied into that effort.

Now, that has received some governmental encouragement, received some governmental funding. But I was saying a few moments ago that we ought to look at some of our policies that may inhibit U.S. firms from doing the same kind of thing. We already have of course one joint venture that has been proposed for research at least in this area, between AT&T and RCA.

The question is, is our legal structure, our regulatory structure, our antitrust structure, such that our own firms are prevented from doing that?

The CHAIRMAN. Would the gentleman yield?

Mr. TANNER. Absolutely.

The CHAIRMAN. Now you are right on target. We were trying to come back and say to the Administration the other way—and I am not being partisan in any stretch of the imagination—we tried to say to them, "Do you have all of the tools you need?" And the response we received was, "Of course we do. We have more bureaucracy into this thing—if we add more bureaucracy, we will not get anything done."

But we are not talking about bureaucracy. We are talking about the fundamental legal tools. And you are striking it on the head. If you are coming back and saying that the antitrust laws in the '30s were put in for a purpose, but it is now hobbling coordinated efforts among industries in this country, is what it amounts to—and particularly, if you talk about a playing field, which we all are getting a little trite in using, we talk about the playing field. If they are not subject to antitrust laws and they confederate together into conglomerates, consortiums, and they can do that work, doesn't it become obvious that something has got to be a hole in the dike? That we cannot do that without putting all of the presidents of companies in jail?

Dr. MOORE. I certainly agree with your point, except that I would say that the antitrust laws originally were formulated in the 19th century, and we are looking forward to the 21st century now.

The CHAIRMAN. And we are having a problem on that, if I used the wrong date, I think we are thinking exactly the same way.

Dr. MOORE. Yes. And the other point I think we ought to take account of is that those laws were formulated with the understanding that the relevant market was the U.S. market. It is not true any more; it is the world market.

The CHAIRMAN. Dr. Moore, you give me credit. I understand that. Where I am trying to come from is, if it is the last thing that this Chairman does, this is a whole series of hearings, not just on this issue—we have not had witnesses come before us that have given us the feeling that we are coordinating. And what should we do?

Now, do we let it drift? Or, do we go ahead and put a massive bill together on HDTV? Do we just give it to the Europeans? That is the alternative. There is not any other alternative about this issue.

The gentleman from Tennessee.

Mr. TANNER. I guess, Mr. Chairman, that with the whole series of hearings that we have held, it comes to me as a sense of frustration. Because Congress cannot set national policy. We can enact a law here and a law there; but it seems to me that we are asking the Administration or the Executive Branch for some direction on how we can help.

And maybe I am just missing the point entirely, but I am not hearing anybody come with constructive policy that we need to do as a Congress, to make a law.

Mr. WALKER. If the gentleman would yield to me, I think you are in part right. But I would also suggest that the Administration came up here with a proposal to spend over $15 billion for science in this year, and Congress is in the process of cutting that by $1 billion. That is in fact setting policy, and it is setting exactly the wrong policy. And the Administration cannot lead, if Congress continues to undercut and undermine the efforts of these folks.

You cannot say to the National Science Foundation, "We want you to do all of these great things, we want you to be involved in basic science, we want you to be involved in applied science, we want you to be doing developmental work, and by the way we can not meet the budget that the Administration has sent up here to do those things."

I think that has to enter in, too, and it is not just the Administration failing in leadership. The Administration is applying—

Mr. TANNER. I did not mean to imply that this is anyone's fault. We have placed blame enough, I think, in the past.

Mr. WALKER. That is right. But we do need to understand that we have to be a part of the policy development that puts the resources in place, that allows these things to be done, and then in addition looks for policies such as changes in the antitrust and so on. So I agree with the Chairman on that.

The CHAIRMAN. If the gentleman would yield a little further, do not feel badly about being frustrated, because I have manifested that.

Mr. Walker is right. We stood on the floor and battled together on these issues, as you know. But one thing that Congress has to understand, and so does the Administration, is that if we are going to create the new wealth of the future for this country, as we have been having these hearings on, these are the absolute key areas where we have to work.

It also seems to me—and maybe I am not quite as frustrated—it seems to me that, if we decided that we are going to do a consortium on high-resolution television, that is exactly what we are going to recommend, and there is very strong bipartisan feeling on the committee in that direction.

Now, some people come back and talk about SEMATECH, and so on, and maybe yes, and this is coming along. It is a successful venture. If SEMATECH becomes a successful venture—and it may not be the solution to all of our problems as far as consortiums are concerned—but nevertheless, if something is going to work and we can apply it someplace else, we ought to apply it. Therefore, we will make the policy from that point of view.

The gentleman from Tennessee.

Mr. TANNER. I am finished.

Mr. VALENTINE. Mr. Chairman, without getting into the technicalities of it, could you arrange for me to ask the distinguished Republican ranking member of this committee a question, if he would yield?

The **Chairman**. He has not had the time.

Mr. **Valentine**. Mr. Walker—

Mr. **Walker**. If the gentleman from Tennessee will yield to you, then you can yield to me, or something. I would be happy to.

Mr. **Tanner**. As a freshman, I yield to everyone here.

[Laughter]

Mr. **Walker**. Isn't that the truth.

Mr. **Valentine**. I would like to ask our esteemed colleague, Mr. Walker, in whom all of us have a lot of confidence, if the President, when he sent his recommendation to the Congress, suggesting that we spend all of this extra money—did he tell us where to get it?

Mr. **Walker**. Yes. In fact, he did, in several instances. For instance, he said that you could cut out subsidizing the 19th century by cutting out AMTRAK. He said that you could cut out programs like EDA, that spend money on lost causes, in order to finance the future. He suggested a number of places where you could eliminate old programs, in order to finance those things that might actually have some impact on the future.

He made some very specific proposals in that regard, and Congress has rejected every one of them. Congress has not in this budget suggested that we are going to eliminate any programs.

The **Chairman**. Some members of Congress.

Mr. **Walker**. Okay. I am suggesting that where the majority will come down—

Mr. **Valentine**. Mr. Chairman, I should have known better, excuse me.

[Laughter]

Mr. **Walker**.—subsidizing AMTRAK, EDA, and all of those. I suggest that is a wrong-headed policy.

The **Chairman**. On that, we will take a break, and we will go to the beautiful lady from Maryland.

Mrs. **Morella**. Thank you, Mr. Chairman.

We were very pleased on the Post Office and Civil Service Committee yesterday to have Dr. Eric Bloch come and comment on retaining some of the additional dimensions of the National Science Foundation. But I can see that there is a need for a strategy, in terms of how we look at and how we react to EC 92.

Particularly, as was mentioned, in high-definition television, do we look at it as "fortress Europe"? One entity? Or, do we have individual companies, like West Germany, come to us to negotiate? Is it one entity for negotiations? Do we do it with a series of countries?

Do you see that as a concern? And what are the thought processes about that?

Dr. **Moore**. Well, at NSF, I can only speak for how we look at it from NSF's point of view. We, of course, as you know, have a long history of strong ties with Europe in science. The whole U.S. science community has that history. And we have very strong bilateral ties with the member countries of the Community.

As far as the Foundation is concerned, we intend to maintain those ties. They are very important for basic science, which of course is our main activity. We are watching very carefully what is going on in the Community, in Brussels, with the Commission, and considering what might be appropriate for dealing with them.

I think, in the long run, from a purely scientific point of view, though, it will be a long time before the individual members relinquish a lot of their basic science activities to control in the Commission. For that reason, we need to maintain these bilateral relationships with the members.

But on the broader point of view, I would have to defer to the State Department. I must say, it is a little unnerving to see a West German come over and seem to be speaking with the support of the Community but representing Germany.

Mrs. **Morella**. I can see that that would be a perplexing problem. NSF has a task force, right?

Dr. **Moore**. Yes.

Mrs. **Morella**. Have you made liaison? Has that task force made liaison with the European nations?

Dr. **Moore**. The task force is just getting underway. I know that individual members will be visiting Europe in the immediate future, and will be calling on the Commission and others in Europe.

Mrs. **Morella**. I would sense that that would be very, very important, that the liaison be made, and as quickly as possible.

Dr. **Moore**. Absolutely. And of course, we have an office in the embassy in Paris that is keeping us alert to what is going on there, and reporting to us on developments. And our own staff are in regular contact with the Community. For example, Dr. Bradshaw himself visits there on a regular basis.

But this task force itself will in fact have members going to the Commission.

Mrs. **Morella**. It seems to me that we have got to be kind of cautiously aggressive, in that we are in an interesting situation, because these individual countries somewhat depend on us, look to us for some leadership. On the other hand, the European Community is going to mean that they do not want to show that they depend on us, or lean on us.

So I think we have got to be aggressive, but in a very careful manner. I think it is a critical time for us. Would you agree?

Dr. **Moore**. I agree. I think you have described the tensions there very well.

Mrs. **Morella**. Thank you, Mr. Chairman.

The **Chairman**. I thank the gentlelady.

Dr. Bradshaw, I know that you were in Europe recently. What was your general feeling? What is the tenor of the feeling? Is there excitement about this potpourri? What did you observe, basically?

Dr. **Bradshaw**. I have to break this down into two sections. One is my conversations with people in the science community, primarily science administrators, technology administrators. The other is the general popular feeling that is expressed through the media, written and television.

Both are very excited. Both are very confident that this thing is going to happen. At that point, the consensus starts to break down, because no one is exactly sure what is going to happen. There is a single market plan with a lot of projections, and they are working slowly toward implementing that. But nobody is sure what the outcome is going to be, and it is causing a lot of apprehension as well.

There are still a lot of old ties, old patterns, old distrust and animosities, in some instances, which are slowing down this process of integration. I do not think that those are going to be gotten out of the way really quickly.

On the part of the community of science and technology administrators, however, in the Community there is a great deal of confidence that this thing is moving ahead, moving ahead very rapidly, and that they are accomplishing most of their objectives, and certainly will accomplish them by the mid-1990s.

Administrators in the capitals of the member states have varying views, but for the most part they are quietly supportive and enthusiastic about the direction the Community is going with its research programs.

Among the population at large, there is a sense that science and technology is running hand-in-hand with the economic objectives of the single market. There is not a lot of distinguishing between the two, even though they are distinct processes.

Dr. MOORE. Mr. Chairman, maybe I could provide a little different insight into the same question for a second. We, that is the director and I, have been, for a period of several years, having a series of meetings with our counterpart agency heads from countries around the world, including Japan and Canada, but more specifically here, the French, the Germans, the Italians, the British, and the Swedes.

We just had one of these meetings about three weeks ago. And we raised this question: What does Europe 92 mean for relationships between the U.S. science establishment, as it were, and the European? Because we raised some concerns about whether, in the process, there may be some clamping down, some closing in in Europe that would limit access by American researchers and scientists to Europe.

The immediate reaction was kind of interesting. Now, these are heads of agencies like ours: CNRS, the SERC from Britain. The immediate reaction was, "It never occurred to us that there would be a problem of this kind." And maybe that says as much about their perceptions of what is going on in Europe as it does about the actual facts in Europe. But that was the immediate reaction.

The second reaction is, "We want to maintain, do everything we can to maintain the openness on a scientific basis level between the United States and our own countries, each of them individually."

The third point was, on reflection they could see that, if there is a shift, for example, of funding for basic research to Brussels, to the Commission, from their own governments, that there might be pressure brought to bear on their scientists to look there for funding instead of to the national governments, and that that might result in there being less funding available for cooperative projects on a bilateral basis.

So I think that we planted a little seed of concern with them. They were, I think, informed by our concern, and a little surprised at it. But nevertheless, very much unified in saying that they want to preserve the kind of relationships that we have had in the past.

The **Chairman**. Okay. I want to thank you very much for your excellent testimony. We appreciate your being with us this morning. You have given us some good food for thought. Thanks for coming.

Our next witness is Stephen Cooney, Director, International Investment and Finance, National Association of Manufacturers.

And because we have a time factor involved here, we also have Mary Tyszkiewicz. Is Mary Tyszkiewicz here?

Would you please come up and join Dr. Cooney, and then we can talk about both of the issues involved. They relate anyway.

We want to welcome both of you here, Dr. Tyszkiewicz and Dr. Cooney.

Dr. Cooney, go ahead.

[The biographical sketch of Dr. Cooney follows:]

BIOGRAPHY OF STEPHEN COONEY

Stephen Cooney is director of international investment and finance at the National Association of Manufacturers in Washington, DC, a position he has held since 1979. His responsibilities include research and analysis on international trade and investment trends. He also works with NAM member companies on a wide range of international investment and financial issues that affect the overseas operations of American companies. Dr. Cooney's most recent major project is EC-92 and U.S. Industry: An NAM Report on the Major Issues for U.S. Manufacturers in the European Community's Internal Market Program.

He has a Ph.D in international relations from the London School of Economics, with earlier degrees from Tulane University and the University of Chicago. He lives in Falls Church, Virginia with his wife Christine and and two children.

STATEMENT OF DR. STEPHEN COONEY, DIRECTOR, INTERNATIONAL INVESTMENT AND FINANCE, NATIONAL ASSOCIATION OF MANUFACTURERS, WASHINGTON, D.C.

Dr. COONEY. I am Stephen Cooney, Director of International Investment and Finance for the National Association of Manufacturers.

I have recently been responsible for writing a report summarizing the European Community's internal market programs, and the possible effects on our members and views and concerns. I have already submitted the report to the committee, and I would like to submit it for the record at the hearing, Mr. Chairman, along with a written statement.

The CHAIRMAN. Without objection, it is so ordered.

Dr. COONEY. In the statement today, I would like to focus on the aspects of the EC 92 program that may have the most effect on U.S. trade performance in competitive technology. I would be pleased to discuss any other aspects of the report with the committee after my testimony.

I also want to point out that we have recently passed a NAM policy on EC 92, and when the final version is prepared we would like to submit that for the record.

The CHAIRMAN. Fine. When do you think it will be ready?

Mr. COONEY. I can get that up to you later today, actually, I believe.

The CHAIRMAN. Splendid.

The statement appears at the conclusion of Dr. Cooney's prepared remarks:]

Dr. COONEY. Let me just say that, in this report, basically—or in this testimony, I do basically two things. The first is to talk about how our trade, especially on high-tech products, has dramatically improved in the European Community, and how we see EC 92 as leading to further improvements in that area. That is the good news.

The second area I guess is not necessarily bad news—some of it is bad, some of the problems, some of the issues that we see emerging in specific EC 92 proposals that could have a direct effect on U.S. high-tech trade performance with the European Community.

The direction of the trade deficit has reversed itself in the last three years, with the recovery of growth in the European Community. Between 1985 and 1988, the overall U.S. trade deficits with the EC was halved from over $20 billion to under $10 billion, and this reversal mainly occurred due to the high rate of U.S. export growth—9 percent in 1986, 10 percent in 1987, and 25 percent last year. And I understand that this morning's figures showed another phenomenal increase in U.S. exports, particularly in capital goods, and a continuing surplus in 1989 with the European Community, a continuing surplus overall.

Recently, our chairman—last week, in fact—Mr. Richard Heckert of DuPont testified before Congress on this subject. He emphasized the role of EC 92 in creating a second, continent-wide economic target for U.S. companies. If EC 92 is successful in its programs' goals, it will mean creation of a large, integrated market, equal to or larger than the U.S. market.

Mr. Heckert's point was that success in such an effort would relieve pressure on the U.S. market, which has been the only large target market for industrial producers world- wide. Moreover, we believe at NAM that, if the Europeans are committed to a policy of world-wide competitiveness, a subject mentioned several times this morning, then they will need to import more and not less high-quality, price- competitive U.S. capital goods.

Manufactured capital goods make up over a third of all U.S. exports, and comprise our strongest area of export performance. In the table attached to the testimony, U.S. high-technology exports have done exceptionally well already as a result of the change in the exchange rate and higher EC growth. I would like to review that, if I may, for a couple of minutes here, in a little more detail.

As shown in the table of high-technology product categories, U.S. exports to the EC have shown high double- digit growth almost across the board over the past three years. The U.S. trade balance in these various high-tech categories has also improved almost across the board.

[The table referred to follows:]

U.S.-E.C. TRADE IN SELECTED HIGH TECHNOLOGY PRODUCTS
1985-1989

PRODUCT GROUP	U.S. EXPORTS		U.S. IMPORTS		BALANCES			
					U.S. - E.C.		U.S. - JAPAN	
	$ Bil. 1988	% Chg. since 1985	$ Bil. 1988	% Chg. since 1985	$ Bil. 1988	Chg. since 1985	$ Bil. 1988	Chg. since 1985
Inorganic Chemicals	0.8	- 9	1.3	6	- 0.5	- 0.2	0.0	- 0.2
Pharmaceuticals	1.7	71	1.0	75	0.7	0.3	0.6	0.1
Power-Generating Machy	4.1	73	4.0	25	0.1	0.9	- 3.1	- 2.1
Computers/Ofc. Machy	10.5	67	4.4	69	6.1	2.4	- 7.9	- 3.6
Non-Consumer Telecom. Equipment	1.3	60	0.6	95	0.7	0.2	- 5.7	- 1.1
Electrical Machy and Pts. - Semiconductors	4.6	72	4.3	70	0.3	0.2	- 7.1	- 3.2
Aircraft and Parts	6.1	85	3.0	55	3.0	1.7	1.8	0.2
Prof., Sci. and Control Instruments	3.0	44	1.8	61	1.2	0.2	- 0.1	0.1

All imports customs value. European Community defined as EC-10 in 1985, EC-12 in 1989.

Source: NAM from U.S. Department of Commerce, Highlights of U.S. Export and Import Trade.

Dr. COONEY. For example, U.S. computer exports to the EC increased by 67 percent in 3 years. The U.S. surplus with the EC increased by $2.4 billion, to over $6 billion. Aircraft exports to the EC nearly doubled, as did the U.S. surplus, from $1.7 billion in 1985 to $3 billion last year.

Power-generating machinery, including all types of engines and parts, an almost $1 billion swing, as the deficit improved to a small surplus. The only exception to the pattern was in the area of inorganic chemicals, which happens to be the smallest listed in this group of eight products.

Now, the significance of these developments is particularly underlined when we compared the performance of U.S. trade with Europe to our performance with Japan. We have had the same circumstances there. We had continued strong growth in Japanese markets, and a much lower dollar exchange rate. But U.S. producers have shown little or no gain on balance, and even losses on balance in some categories. For example, our trade balance with Japan in computers and electrical machinery and parts, the latter including semiconductors, has worsened by $3 billion in each category. It is worse by over $2 billion in power- generating machinery.

So it is quite probable that the existence of the effective market barriers in Japan in many high-technology capital goods products have contributed to the continued failure of the U.S. deficits, and it is hard to turn around on the products. This pattern underlines the importance to the United States of a relatively open EC market, and one where dynamic growth continues.

I think that is really the bottom line as to why most of our companies are extremely excited about the possibility of a more dynamic and deregulated EC market, with, we believe, certainly reduced protectionism within Europe, and, we also hope, reduced protectionism with respect to outside trade.

Of course, as I mentioned and emphasized in the report, there are some strong concerns with certain specific EC proposals. Many of them are, in fact, a double-edged sword. The basic proposals promise to create a more uniform and open market, but they do contain specific provisions or questions of interpretation that could threaten established or potential interests for U.S. exporters. I have listed several of them here.

Technical standards: In principle, the doctrine of technical standards will be of major benefit for U.S. companies, but there are concerns over how the EC standards- setting process will work. Now, to allay some of these concerns, EC standards-setting bodies have promised improved transparency and access to information, as new standards are proposed and developed. But U.S.-based companies, as indicated in testimony earlier, are still to be denied direct access to the setting of voluntary standards at the EC-wide level for most products.

Another potential problem area is the mutual recognition of testing and certification procedures. The EC has indicated that it will soon begin negotiations with non-EC countries for reciprocal access to testing and certification procedures. In NAM's view, the establishment of harmonized EC-wide testing and certification procedures should, in any case, not lead to discrimination against non-EC products.

If you want to see, I would suggest, Mr. Chairman, a sort of acid test, as it were, for the effectiveness of coordinated government policy, the EC has said that they will start considering negotiations of such access beginning this summer. That may be one area that one would like to look into.

A second area is public procurement, where EC 92 includes proposals to enhance existing EC rules on opening of member government procurement. That is a promising step, and it could lead to a significant expansion and liberalization among present signatories of the GATT procurement code.

On the negative side, the procurement directives for the four presently-excluded sectors—water, energy, transport, and telecommunications—include specific local-content rules that favor EC source products and services. It is similar to our own, I must say. The EC has stated its willingness to reduce or eliminate the preference margin in negotiating reciprocal access arrangements with trading partners, but they have also said that Community—and this is a direct quote—

> "Community producers should, where necessary, be
> given the necessary time for the industrial
> adaptation required to meet the objectives
> of 1992 and the date when reciprocal access
> is finally agreed."

That amounts to a transitional protection for developing and restructuring industries in these four sectors. Where industries are weak, they will be given the chance to get "temporary protection."

R&D has been, of course, discussed quite a bit here. I want to add to the testimony that you have got in front of you. I think the comment, in listening to discussions, particularly with the gentleman from the NSF this morning, that you have got to understand, to a certain extent, the EC R&D programs are meant to overcome diversification between, and problems in relating different programs. So that, we are not sort of starting from the same starting line, as it were, as the EC. We are not all running—they are running with a handicap.

It is like Japan and the U.S. Our policy may be effective in Japan, but most of the time theirs seems to be more effective than ours. But we are like two-legged runners in the race, and then you have two other runners, which may represent the EC countries, and they are trying to run a three-legged race, two of them tied together. So I think you have to remember that. A lot of the EC R&D support programs are aimed at overcoming the handicap of having diverse national members within the European Community.

Let me give you an example. I met a couple of years ago with our member, Siemens, in Munich, in the Munich headquarters. And they pointed out that each year they spent more as a company on R&D than the entire ESPRIT program, ESPRIT I, for a five-year period. So that is the kind of magnitude you are dealing with.

So I think we have to keep this in mind. We have to keep it in context, when we talk about EC R&D programs. I think, if you look at those programs, however, the best I can say at this point is that they are ambiguous with respect to participation with known EC companies. U.S. companies have gained access to some important programs and pre-competitive joint research, but they have seldom been able to assume project leadership roles.

Now, on sectoral trade issues, rules of origin, and local content, that is another area where there has been serious concern because of the general implications of targeted trade restrictions that are being discussed or that have been proposed in some areas, particularly the high- tech semiconductor industry issues that are mentioned here today.

I would also mention that someone mentioned that many of these policies are aimed at Japan, and we should not worry about them. That is hardly true. One of the responses of the American industry to the higher dollar in the early '80s and the low yen, was to integrate Japanese components into U.S. products that are exported world-wide. Suddenly, you have the EC then talking about a local content rule.

To the EC, the local content rule, it does not matter whether it is U.S. or Japanese content. It is a non-EC content. So I think we are very much impacted in some cases by proposals that are aimed at Japan. We need to remember to keep that in mind when we deal with this problem.

I have also noted already of course the discriminatory public procurement rules in the so-called excluded sectors. And I have mentioned also—and I do not want to take my other panelist's time here, so I will just mention the other areas—intellectual property rights: we indicated basically we are in agreement with the direction they are going in there. And the competition policy.

I would like to, in addition to what is in the written statement, just add one other point here, because I think most people are missing this point. I have made the point earlier that in trying to become more competitive world- wide, the European Community companies, are looking for more U.S. input, not less.

Now similarly, we see a much higher rate of mergers, I think, and proposed joint ventures and other transactions of EC companies with U.S. companies and Japanese companies as a result of EC 92. If you are a French company and you want to get into the German market, why should you join up with the number two or number three or number four German producers? They are already losing in that market anyway. Bring in a top-notch U.S. or Japanese partner. We see this happening quite a bit EC-wide.

And finally, and I think it will be particularly interesting to this committee in the future, I just want to mention two technical issues that could have come potential impact. Those are the development of a common export control policy in the European Community—

The CHAIRMAN. If the gentlemen would yield, let me ask you to hold. We have to vote, and we will be right back.

Mr. COONEY. All right. I thank you.

The CHAIRMAN. Be patient, and we will be right back.

[Whereupon, there ensued a recess]

Mr. VALENTINE (Acting Chair): If the witnesses will have a seat— This was a little coup d'etat.

[Laughter]

The CHAIRMAN. You have got to be on the ball around here. Dr. Cooney.

Dr. Cooney. I will finish up with two very quick remarks.

As the hearing broke, I said that there are two potential issues. One of them was development of a single EC-wide export control system, which will probably have to emerge as the result of an internal market. This could create some problems for U.S. trade relations with the EC.

The other area was the planned extension of newly tightened EC government procurement rules to the generally excluded sector so far of defense procurement, and how this might affect American defense contractors in world competition, including the United States.

And I would like to close with one final statement. Based on some comments that we were having in a discussion here during the break—because no one has asked me this question yet, and I would like to close with this for this committee's record.

Someone asked me: "What is the view of European Community industry associations, what is their view on EC 92?" The answer that I have—and certainly I have discussed this directly with many of them in Europe and the United States—is that they are very strongly supportive. I have not found one yet that is not.

I have talked with the British association, the French, some associations in Germany. Uniformly, I find them very, they have some concerns just as we do, but uniformly we find them very supportive of the EC 92 process.

With that, Mr. Chairman, thank you for your attention, and I am pleased to answer any questions you may have.

[The prepared statement of Dr. Cooney follows]

MANUFACTURING
CREATES
AMERICA'S
STRENGTH

TESTIMONY OF
STEPHEN COONEY
DIRECTOR, INTERNATIONAL INVESTMENT AND FINANCE
NATIONAL ASSOCIATION OF MANUFACTURERS

ON
THE IMPACT OF THE EUROPEAN COMMUNITY
1992 INTERNAL MARKET PROGRAM
ON U.S. COMPETITIVENESS IN SCIENCE AND TECHNOLOGY

BEFORE THE
COMMITTEE ON SCIENCE, SPACE AND TECHNOLOGY
U.S. HOUSE OF REPRESENTATIVES

MAY 17, 1989

National Association of Manufacturers
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The National Association of Manufacturers is a voluntary business association of more than 13,500 member companies and subsidiaries, large and small, located in every state. Members range in size from the very large to the more than 9,000 smaller manufacturing firms, each with fewer than 500 employees. NAM member companies employ 85 percent of all workers in manufacturing and produce more than 80 percent of the nation's manufactured goods. NAM is affiliated with an additional 158,000 businesses through its Associations Council and the National Industrial Council.

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Mr. Chairman, I am Stephen Cooney, Director of International Investment and Finance for the National Association of Manufacturers. NAM is a voluntary business association of over 13,500 manufacturing companies of all sizes, and their subsidiaries. Our members employ over 85 percent of all U.S. workers in manufacturing. They produce over 80 percent of the nation's manufactured goods and a similar share of the nation's total manufactured exports.

I have recently been responsible for writing an NAM report summarizing the European Community's Internal Market Program (EC-92), its possible effects on our members, and their views and concerns. I would like to submit this report, EC-92 and U.S. Industry with my written statement. In today's statement, I would like to focus on the aspects of the EC-92 program that may have the most effect on U.S. trade performance in competitive technology-intensive products. I would be pleased to discuss other aspects of the subject covered in the report with committee members after my testimony.

Summary of Testimony

The basic thrust of my testimony is that U.S. products are already highly competitive in the E.C. market. Therefore, if the EC-92 program succeeds in encouraging higher growth, deregulation and reduced trade barriers in the E.C. market, the result will be improved U.S. export performance there. We have already seen major gains in U.S. high technology exports to the E.C. since 1985, and this will accelerate if EC-92 is successful. What may emerge is a second large-scale integrated market for U.S. high technology products.

But the testimony also focuses on those areas of EC-92 policy decisions where problems could develop for U.S. high technology goods exporters. In most of these areas, the E.C. will take decisions that either enhance or reduce the scope for U.S. trade with the E.C. Some of the major concerns involve:

-- Development of E.C.-wide technical standards;
-- New public procurement rules;
-- E.C. research and development support programs;
-- Sector-specific commercial policies;
-- Intellectual property rights protection;
-- Competition policy;
-- Emerging issues regarding export controls and defense procurement.

U.S. Exporters of High Technology Goods Should Gain from EC-92

The direction of the U.S. trade deficit with the E.C. has dramatically reversed itself with the three-year fall in the dollar exchange rate and the recovery of E.C. growth. Between 1985 and 1988, the overall U.S. deficit with the E.C. was halved, from over $20 billion to under $10 billion -- in early 1989, we actually ran a surplus with the E.C.

Moreover, this reversal in U.S. trade performance with the E.C. was accomplished by a high rate of U.S. export growth: up 9 percent in 1986, 14 percent in 1987 and 25 percent last year. Our overall imports from the E.C. did not fall, so our trade improvement has been accomplished in a period of continued U.S. growth -- not a period of austerity -- and a period of growing two-way trade.

Recently NAM's chairman, Richard E. Heckert of Du Pont, testified before Congress on this subject, and emphasized the role of EC-92 in creating a second continent-wide economic target for U.S. companies. EC-92 is primarily concerned with the elimination of market barriers internal to the European Community. If successful, this means creation of a large, integrated market equal to or larger than the U.S. market. Mr. Heckert's point was that success in such an effort would relieve pressure on the U.S. market, which has been the only large target market for industrial producers worldwide.

But some observers have expressed concern about the competitive performance of strengthened E.C. producers in world trade -- in the U.S. market and in direct competition with U.S. products in third country markets. If such improved competitiveness derives from improved efficiencies and economies of scale, then we believe we can only welcome such positive competition that results from good policy choices. If anything, such a development should stimulate a reassessment in the United States as to how all of our own domestic policies affect our industries' ability to compete worldwide.

Moreover, we believe at NAM that if the Europeans are committed to a policy of worldwide competitiveness, then they will need to import more, not less, high-quality, price-competitive U.S. capital goods. Manufactured capital goods make up over a third of all U.S. exports and comprise our strongest area of export performance. As shown in the table attached to the testimony, U.S. high technology exports have done exceptionally well already as a result of the change in the exchange rate and higher E.C. growth. We would expect this pattern to continue as a result of EC-92.

Major Improvement in U.S. High-Technology Trade with E.C.: Detailed Analysis

To support this view, let me review U.S. trade performance in high technology trade with ~~E.C. in~~ some detail. In the attached table, I have examined the U.S. trade performance with the E.C. in some typical "technology-intensive" product categories, as identified by various authors who have studied U.S. competitiveness. For comparison, I have also included the change in the U.S.-Japan trade balances in these fields.

In this list of high technology product categories, U.S. exports to the E.C. have shown high double-digit growth almost across the board over the past three years. E.C. exports to the United States have also grown rapidly in these products, but this is probably due in large part to dollar price increases more than volume growth. And the U.S. trade balance -- which is in surplus for virtually every category -- has also improved almost across the board.

For example, U.S. computer exports to the E.C. increased by 67 percent in three years, and the U.S. surplus with the E.C. increased by $2.4 billion, to over $6 billion. This occurred despite the virtual loss of our overall U.S. surplus worldwide in computers and office machinery. Similarly, aircraft exports to the E.C. nearly doubled, as did the U.S. surplus -- from $1.7 billion in 1985 to $3.0 billion last year. In power-generating machinery, which includes all types of engines and parts, we have seen an almost $1 billion swing, as a substantial U.S. deficit improved to a small surplus. The only exception to this pattern of rapid U.S. export growth and improved trade balance with the E.C. was in inorganic chemicals, the smallest U.S. export category listed, and one in which there was little three-year change in either exports or imports.

The significance of these developments is underlined when we compare the performance of U.S. trade with Europe to our performance with Japan. Despite a much lower dollar and a vaunted shift to domestic demand-led growth in Japan, U.S. high technology prospects in trade with Japan have failed to improve. U.S. producers have showed little or no gain on balance in all categories, and even substantial losses in some: over $3 billion each in computers and electrical machinery and parts, and over $2 billion in power-generating machinery.

While changes in macroeconomic conditions, including a lower dollar, have contributed to some reduction in the U.S. trade deficit with Japan, it is probable that the existence of effective market barriers in many high technology, capital goods products have contributed to the continued failure of the U.S. deficit with Japan to turn around in many of these products. This pattern underlines the importance to the United States of a relatively open E.C. market, and one where dynamic growth continues.

Concerns with Specific EC-92 Policies

All this is not to imply that NAM members have no concerns regarding some spec~~ific~~ EC-92 proposals. Quite the contrary -- the high stakes involved in keeping that market open and opening it wider have raised the concern of our members with EC-92 proposals in some areas. Over the past year, there has been no hotter international economic issue among our members.

Most of these specific EC-92 issues are a double-edged sword for U.S. companies. The basic E.C. proposals promise to create a more uniform and open market, but contain specific provisions or questions of interpretation that could threaten the established or potential interests of U.S. exporters.

Technical Standards -- The harmonization of technical standards, a key goal of EC-92, can have a major impact on current and future access of U.S. goods to the E.C. market. In principle, the adoption of common standards is widely seen by U.S. companies in Europe as a major benefit. U.S. companies with production facilities in Europe believe that they will be able to rationalize production across national frontiers to a much greater degree than at present. U.S. exporters may achieve comparable benefits. Whatever standard is adopted for a product, the potential U.S. exporter will be assured that complying with this standard provides access to the entire E.C. market.

But there are concerns among U.S. companies over the improved and expedited European standard-setting process. To allay some of these concerns, E.C. standards-setting bodies have promised improved transparency and access to information as new standards are proposed and developed -- though U.S.-based companies are still to be denied direct access to the setting of voluntary standards at the E.C.-wide level.

Another potential problem area is in the mutual recognition of testing and certification procedures. The E.C. has indicated that it will soon begin negotiations with non-E.C. countries for reciprocal access to testing and certification procedures. In NAM's view, the establishment of harmonized E.C.-wide testing and certification procedures should in any case not lead to discrimination against non-E.C. products.

Public Procurement -- EC-92 includes proposals to enhance existing E.C. rules on the opening of member government procurement and to extend E.C. rules to the sectors presently excluded from GATT or E.C. discipline. The opening of such procurement within the E.C. is a promising step, and could lead to a significant expansion of liberalization among present signatories of the GATT procurement code.

On the negative side, the procurement directives for the four presently excluded sectors (water, energy, transport and telecommunications) include specific local content rules that favor E.C.-source products and services, unless trading partners liberalize their own procurement rules in an equivalent manner. These E.C.-content rules are similar to U.S. "Buy America" provisions in many federal contract laws.

The E.C. has stated its willingness to reduce or eliminate this preference margin in negotiating reciprocal access arrangements with trading partners. But the European Commission has also frankly stated that, "Community producers should, where necessary, be given the necessary time for the industrial adaptation required to meet the objectives of 1992 and the day when reciprocal access is finally agreed." This amounts to transitional protection for developing and restructuring industries in these four sectors.

E.C. Support for Research and Development -- The record of E.C.-sponsored R&D programs has always been at best ambiguous with respect to the participation of non-E.C. companies -- even those with research and production facilities in the E.C. U.S. companies have gained access to some important programs in pre-competitive joint research in information technology (ESPRIT II), for example, but seldom have they been able to assume project leadership roles. With regard to the European semiconductor technology consortium (JESSI), the exclusion of foreign participation from the U.S. Sematech program has been cited as a basis for excluding future U.S. companies' participation in the competitive E.C. project.

And, in addition to direct member government financing of the Airbus consortium, the E.C. has now announced a $40 million pilot program in aeronautical R&D, which could lead to E.C. support for aviation technology development on a much larger scale in the near future.

Sectoral Trade Issues and Rules of Origin and Local Content -- NAM has expressed its concern with the development of E.C.-wide common commercial policies in a number of specific cases (whether or not directly part of the EC-92 program) because of the general implications of targeted trade restrictions in these areas. With respect to trade in high-technology products, our members are particularly concerned with the proposed rules of origin in the semiconductor industry, which threaten to force U.S. producers to shift output totally to the E.C. in servicing that market, or face a scale of tariff duties much higher than the equivalent rate in the United States.

Also, I have already noted above discriminatory public procurement rules proposed in the excluded sectors directives, and these could affect U.S. producers, especially in the energy and telecommunications equipment fields. NAM has indicated, for example, its support of the telecommunications provision of the 1988 Trade Act, which is now being used by USTR in an effort to gain improved access to the E.C. telecommunications market.

Intellectual Property Rights -- Enhancement and completion of a Europe-wide system of protection of trademarks, patents and copyrights form an important component of completing the internal market. In general, the E.C. appears to be adopting policies that are compatible with U.S. policy approaches. On the other hand, I should mention that the E.C. attack in the GATT on Section 337 of the U.S. trade law poses the possibility of a serious trade policy confrontation in this field.

Competition Policy -- Establishment of E.C.-level control over mergers and acquisitions involving large-scale multinational combinations, as proposed in a regulation drafted last year, is potentially of major importance for U.S. businesses in the E.C. Such a policy, if it allows for a quick and exclusive ruling by the E.C. on proposed mergers, can reduce the obstructive or delaying effect of approvals by multiple national jurisdictions.

U.S. companies generally support this policy. Within the proposal, however, there is a provision that would allow mergers considered anticompetitive to proceed, if the European Commission considers that such a merger or acquisition "promot[es] technical or economic progress..." particularly "with regard to international competition." This could become an important instrument with respect to the encouragement of mergers among E.C.-based companies, to the detriment of U.S. companies participating in the E.C. market.

Potential Issues -- NAM's members have identified two other areas where there are no formal proposals, but where future decisions will probably have a strong impact on U.S. business interests. One is the probable development of a single E.C.-wide export control system, as a result of EC-92. The other is the planned extension of newly tightened E.C. government procurement rules to the generally excluded sector of defense procurement, which some fear could create a systematically protected and favored E.C.-based defense industry. Both of these developments could impair future competitiveness of U.S. high technology industries.

***

This concludes the list of important EC-92 issues for U.S. companies, regarding future competitiveness in high technology industries. I would be pleased to answer any questions regarding this statement or the report that I have submitted.

U.S.-E.C. TRADE IN SELECTED HIGH TECHNOLOGY PRODUCTS 1985-1989

PRODUCT GROUP	U.S. EXPORTS		U.S. IMPORTS		BALANCES			
					U.S. - E.C.		U.S. - JAPAN	
	$ Bil. 1988	% Chg. since 1985	$ Bil. 1988	% Chg. since 1985	$ Bil. 1988	Chg. since 1985	$ Bil. 1988	Chg. since 1985
Inorganic Chemicals	0.8	- 9	1.3	6	- 0.5	- 0.2	0.0	- 0.2
Pharmaceuticals	1.7	71	1.0	75	0.7	0.3	0.6	0.1
Power-Generating Machy	4.1	73	4.0	25	0.1	0.9	- 3.1	- 2.1
Computers/Ofc. Machy	10.5	67	4.4	69	6.1	2.4	- 7.9	- 3.6
Non-Consumer Telecom. Equipment	1.3	60	0.6	95	0.7	0.2	- 5.7	- 1.1
Electrical Machy and Pts. - Semiconductors	4.6	72	4.3	70	0.3	0.2	- 7.1	- 3.2
Aircraft and Parts	6.1	85	3.0	55	3.0	1.7	1.8	0.2
Prof., Sci. and Control Instruments	3.0	44	1.8	61	1.2	0.2	- 0.1	0.1

All imports customs value. European Community defined as EC-10 in 1985, EC-12 in 1989.

Source: NAM from U.S. Department of Commerce, Highlights of U.S. Export and Import Trade.

NAM

NATIONAL ASSOCIATION OF MANUFACTURERS
RESOLUTION
ON THE
EUROPEAN COMMUNITY 1992 INTERNAL MARKET PROGRAM

The plan to complete implementation of the European Community internal market by 1992, known in shorthand as EC-92, will have major effects on NAM member companies. Both U.S. exports to the European Community and the operations of U.S. companies with investments in the E.C. will be affected.

As indicated in its recent report, EC-92 and U.S. Industry, the National Association of Manufacturers believes that the overall impact of the EC-92 program will be to encourage strong and dynamic growth, in an increasingly deregulated E.C. market. The results, we believe, will be beneficial for industry in Europe, and for European workers and consumers. We also believe that if this program is successful, it will provide a positive stimulus to world trade growth.

But as this NAM report showed, U.S. industry has a series of specific concerns regarding the outcome of specific issues in the EC-92 process. Decisions on these issues could either enhance or reduce the opportunities for U.S. companies' trade and investment in the E.C.

NAM represents the full spectrum of U.S. industry. This includes the largest U.S. industrial companies, which may have major production facilities in Europe, in addition to exports into that market. NAM also has over 9,000 smaller manufacturing member companies, with fewer than 500 employees each, that typically service foreign markets through exports. This resolution has also been developed with the active participation of the NAM Associations Council, representing 144 cooperating sectoral trade associations. The major issues for U.S. companies as outlined in this resolution therefore reflect the full range of NAM members' concerns. These major issues are:

Technical and Environmental Standards and Certification -- U.S. industry is encouraged by the "new approach" being taken to develop Europe-wide technical standards. Consonant with E.C. obligations under the GATT Standards Code, we expect that any new standards developed on a Europe-wide basis will be transparent and compatible with international standards. New Europe-wide standards should not create de facto trade barriers. Similarly, the establishment of an E.C. regime for product testing and certification should not lead to any discrimination against products made or services offered outside Europe. Where appropriate, there should be negotiations for mutual recognition of testing and certification procedures.

Public Procurement -- U.S. industry is encouraged by the strengthening of existing E.C. rules on the opening of member government procurement and by the proposed extension of E.C. rules to the sectors presently excluded from GATT or E.C. discipline. We hope that the E.C. would also initiate discussions as soon as possible looking toward inclusion of these sectors in a more effective GATT Government Procurement Code. We also must express concern about the possible world trade impact of several provisions in the excluded sectors directives, including the local content rule, use of transitional measures and treatment of non-E.C. suppliers based on "equal access."

Reciprocity -- The European Commission has stated that intra-E.C. market opening initiatives should be extended to non-E.C. producers only insofar as E.C. trading partners provide equivalent access to their markets for E.C. producers, and insofar as market access rules are not already determined by GATT obligations. It has also indicated its willingness to negotiate this question of reciprocal access in multilateral as well as bilateral forums. In recent revisions proposed in the draft Second Banking Directive, the E.C. also declared that it would adhere to a national treatment standard as the basis for reciprocity. NAM supports U.S. negotiations with the E.C. in all available forums, with the primary goal of strengthening an open, multilateral world trade system. In any case, we expect that the E.C. will continue to apply national treatment to U.S. exports as established under Article III of the GATT, and we hope that national treatment will be the basis of reciprocity in all areas where it is applied by the E.C.

Rights of U.S. Companies -- NAM members are concerned that some proposals in the EC-92 progam could include a qualification of the general principle of national treatment of U.S.-owned companies in the E.C. as established under Article 58 of the Treaty of Rome.

Rules of Origin, Local Content and E.C. Trade Policies -- Completion of the internal market may result in the replacement of national import quotas, whether formal or informal, with E.C.-wide measures. Any effort to do this should be consistent with the GATT. Only in that way can the United States be sure that its GATT interests will be considered and that appropriate consultations will take place.

Moreover, there is an ongoing development of E.C. rules of origin of traded goods and evolution of local content rules that determine whether goods are of E.C. origin, for the application of specific antidumping penalties. NAM members are seriously concerned that the evolution of such policies could lead to development of general local content rules, which have previously been opposed by both the United States and the European Community in the present GATT negotiations.

Sectoral Trade Issues -- The NAM is particularly concerned with the future development of E.C.-wide common commercial policies and other sectoral initiatives regarding automobiles, telecommunications, information technology and, as recently announced, aerospace manufacturing. Such policies may include new restrictive quotas, local content rules and direct subsidization of commercial research, development and manufacturing production. Certain aspects of proposed policies in these areas have broad implications for general trade policy.

Intellectual Property -- NAM members strongly support the enhancement and completion of a Europe-wide system of protection of trademarks, patents and copyrights. We believe that this will strengthen international intellectual property protection.

Social Dimension -- NAM members with investments in the E.C. are strongly interested in the issue as to whether EC-92 should be accompanied by new initiatives in employment and social affairs, and what type of initiatives would be most effective under the EC-92 program.

Competition Policy -- NAM members believe that establishment of E.C.-level control over mergers and acquisitions, particularly large-scale multinational combinations, can expedite the development of improved cross-border efficiencies and economies of scale within the E.C. Such an E.C.-wide policy, however, should replace existing national approval authority for such mergers within the E.C., and not merely add an extra approval procedure to existing national competition policy controls.

Monetary Policy -- NAM members with business operations and transactions in the E.C. are encouraged by the decision to eliminate all controls on capital movements within the E.C., and by consideration of other measures designed to reduce the costs and difficulties of intra-E.C. financial transactions.

Potential Issues -- NAM members are especially interested in future proposals which may be developed regarding establishment of an E.C. system of export controls of strategic products and technology, and reduction of defense procurement barriers within the E.C.

* * *

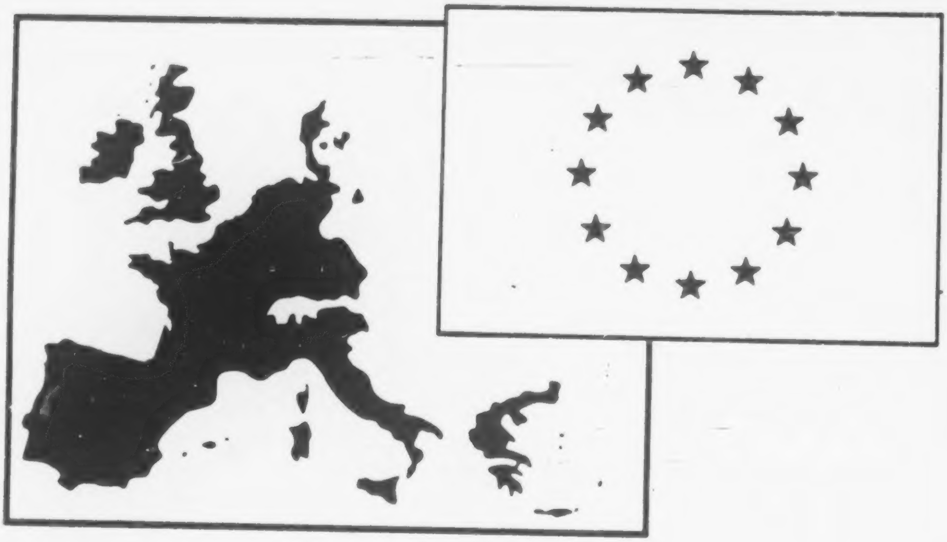
The NAM supports U.S. government consultations with the E.C. and, where appropriate, negotiations, on the issues above that are directly relevant to U.S. trade interests. Such discussions could be on a direct bilateral basis or in the GATT. In particular, NAM reaffirms its support for U.S. participation in the GATT Uruguay Round, as well as in the strengthening and expansion of GATT codes on non-tariff measures.

Furthermore, NAM calls upon the U.S. government to strengthen the support that it provides U.S. exporters in Europe. The Department of Commerce, the Office of the U.S. Trade Representative and the State Department have so far done a commendable job in identifying and disseminating information on EC-92 issues. It is our view, however, that more resources need to be devoted to this task, especially by strengthening the U.S. and Foreign Commercial Service.

This resolution will also be presented directly to the Delegation of the Commission of the European Communities. More detailed policy positions on the issues listed above may be developed, as E.C. policy proposals are themselves developed more fully.

Adopted by
International Trade Policy Committee
International Investment and Finance Committee
National Association of Manufacturers
May 10, 1989

EC-92 and U.S. Industry



An NAM Report on the Major Issues for U.S. Manufacturers
in the European Community's Internal Market Program

by Stephen Cooney
Director, International Investment and Finance

NAM

National Association of Manufacturers
February 1989

The National Association of Manufacturers is a voluntary business association representing approximately 13,000 member companies and subsidiaries—large and small—located in every state. Members range in size from the very large to the more than 9,000 smaller manufacturing firms, each with fewer than 500 employees. NAM member companies employ 85 percent of all workers in manufacturing and produce more than 80 percent of the nation's manufactured goods. NAM is affiliated with an additional 158,000 businesses through its Associations Council and the National Industrial Council.

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FOREWORD

Over the past year, a new buzzword -- EC-92 -- has sprung up in our vocabulary. EC-92, of course, refers to the plans of the European Community to eliminate barriers to the completion of the E.C.-wide internal market by 1992. While the buzzword may be new, the work in the European Community to achieve this goal has been going on since 1985.

For U.S. manufacturers exporting to and operating in Europe, EC-92 is an extremely important issue. U.S. exports to the EC amount to $80 billion and intra-EC sales of U.S. firms in Europe total $550 billion annually. Two-thirds of the non-communist world's GNP is accounted for by the economies of the E.C. and the United States. What goes on within the E.C. market, therefore, has an important bearing on the interests of the rest of the world.

While NAM has been following this issue since 1985, it was not clear to us exactly how the interests of the American manufacturing community were affected by EC-92, despite the rather extensive amount of recent press coverage. We decided, therefore, to conduct an extensive series of discussions and interviews with government and corporate officials on both sides of the Atlantic with the aim of producing a report on what EC-92 means to the American manufacturing community. Stephen Cooney, Director for International Investment and Finance at NAM, has been in charge of this work over the past six months and the results of his efforts follow.

This report is intended to help identify the important issues for American manufacturers in EC-92. It is designed as an information document and not as an NAM policy statement. Development of NAM policy positions on specific EC-92 issues will be coordinated by an NAM Task Force on EC-92, chaired by Glen J. Skovholt, Director, Policy and Strategy for Corporate Public Affairs, Honeywell Inc.

We would encourage any comments and analysis on this NAM report and we would be glad to answer questions or hear comments about how EC-92 affects American manufacturing interests.

Howard Lewis III
Vice President, International
Economic Affairs
National Association of Manufacturers

EC-92 AND U.S. INDUSTRY

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EC-92 AND U.S. INDUSTRY

EXECUTIVE SUMMARY

The plan to complete the opening of European Community internal market by 1992, known in shorthand as EC-92, promises to have major effects on U.S. industry. The overall view of U.S. industry is strongly positive. NAM members emphasize the positive impact of strong and dynamic growth, in an increasingly deregulated market.

This report aims to provide guidance for NAM members on the changing European business environment. It focuses on the specific issues and proposals related to EC-92 that have been identified as being of most concern to U.S. industry, rather than the overall history, politics and economics of the E.C. internal market program. The report is based on extensive consultations by the author with NAM member firms in the United States and Europe, cooperating business associations, and information provided by representatives of the U.S. government, staff of the European Commission in Brussels and officials of E.C. member-state governments and private trade associations.

This report is divided into two parts:

Part I: Evolution of EC-92 and U.S. Industry is an overview of both the interests of U.S. industry in EC-92 and the development of the EC-92 program. The major subjects of this part of the report are as follows.

What Is at Stake for U.S. Industry?

As indicated in NAM's recent comprehensive trade report, the E.C. may be the strongest and most important market from the perspective of increasing U.S. exports. The fall in the dollar, improved E.C. growth rates and the relatively open E.C. market has led directly to a three-year boost in the level of U.S. exports. The 1988 level was $27 billion higher than in 1985. This has also meant reducing our trade deficit with the E.C. from $24 billion to $12 billion, accounting for over a third of the total $33 billion improvement in the U.S. trade deficit in 1988. Moreover, the E.C. is far and away the most important host for U.S. manufacturing investment abroad -- at $65 billion, more than half the worldwide total.

The E.C. Internal Market Program

The basic thrust of EC-92 is to complete the internal market established as a European objective by the Treaty of Rome over 30 years ago. As laid out in the E.C.'s 1985 "white paper," this involves the pragmatic elimination of three major types of barriers.

-- **Physical barriers** at the borders to the free flow of goods and persons;

-- **Technical barriers** that prevent goods produced or traded in one member state from being sold in others;

-- Fiscal barriers such as the red tape, delays and costs of different national tax systems which prevent cross-border trade.

Also associated with the elimination of these barriers are major initiatives in related areas, including competition policy, encouragement of research and development, establishment of coordinated monetary policies with possible monetary union, and decisions on common social policies.

Prospects for Completing EC-92 and the Process of Adopting EC-92 Policies

The first part of the report reviews the major issues involved in the completion of the ambitious EC-92 program. It notes that whatever the outcome of these politically sensitive questions, which could prevent the goals of the 1985 White Paper from being fully achieved, many directives and policies related to 1992 will go into effect as they are approved by the E.C. The reappointment of President Jacques Delors for a second term as President of the European Commission, beginning in January 1989, indicates the strong commitment of E.C. member states to achievement of the internal market goal. During the term of the new commission, which ends on December 31, 1992, the conditions for U.S. companies of doing business in the E.C. will be changed in a major and irrevocable way.

The first part of the paper concludes with an analysis of how EC-92 policies are developed and adopted within the E.C. institutional framework. It also summarizes the ways in which U.S. companies can seek access to provide and receive information on how the process may affect their interests.

Part II: Major Issues for U.S. Companies in EC-92 reviews the major issues that could either enhance or reduce the opportunities for U.S. companies as investors in or exporters to the E.C. These major issues represent the subsections of Part II of the report. Within each subsection, the report analyzes the principal relevant proposals of the EC-92 program that have been adopted or considered to date.

1) **Technical and Environmental Standards** -- The harmonization of technical standards, a major part of EC-92, can have a major impact on current and future access of goods produced by U.S. companies for the E.C. market. The expedited adoption of common E.C. standards is widely seen by U.S. companies as a major benefit. However, there are serious concerns regarding timely and adequate access to standards information through the voluntary E.C. "CEN/CENELEC" standards-setting process. Also, U.S. companies have concerns regarding the implementation of E.C. certification and testing recognition procedures.

2) **Public Procurement** -- The enhancement of existing E.C. rules on the opening of member government procurement and the extension of E.C. rules to the sectors presently excluded from GATT or E.C. discipline are designed to increase dramatically cross-border procurement within the E.C. The new rules, at least in the previously excluded sectors, will not necessarily apply to non-E.C. source products. But the E.C. has indicated a willingness to consider open access on a reciprocal basis, either bilaterally or multilaterally.

NAM members have indicated concern with the new local content rules included in the proposals regarding procurement in the presently excluded sectors, but are encouraged by the principle of opening these markets within the E.C. and the commitment to negotiating opening of these sectors to other signatories of the GATT procurement code.

3) **Reciprocity** -- The controversial stated E.C. policy of extending intra-E.C. market opening initiatives to non-E.C. producers only insofar as E.C. trading partners provide equivalent access to their markets for E.C. producers has led to great public concern with the emergence of a "Fortress Europe" in world trade. The October 1988 Commission statement on the definition of reciprocity has alleviated some U.S. industry concerns regarding this subject.

4) **Sectoral Trade Issues** -- This report particularly focuses on the future development of E.C.-wide common commercial policies and other sectoral initiatives regarding automobiles, telecommunications and information technology, because of the broader implications of policies in these areas.

5) **Rules of Origin and Local Content** -- U.S. industry is strongly concerned with the development of E.C. rules that determine whether goods are of E.C. origin, not only for the application of specific trade benefits or penalties, but also on a more general basis regarding the treatment and access of foreign companies or producers in the E.C. market.

6) **Intellectual Property** -- Enhancement and completion of a Europe-wide system of protection of trademarks, patents and copyrights is a process that pre-dates EC-92. But it has been stimulated by plans to create a more integrated market. Generally, U.S. companies are supportive of proposals to allow registration in one member country to be valid for the whole Community, as well as to broaden the products that are covered by E.C.-wide copyright rules. There are concerns, however, with some proposed reform procedures.

7) **Social Dimension** -- The increase in unemployment in the E.C. between the early 1970s and the 1980s has been a major stimulus for the acceptance of the EC-92 program. The "social dimension" of EC-92 includes new initiatives in employment and social affairs related to the creation of a more integrated E.C. market. Both U.S. companies and E.C. industry generally have been supportive of proposals aimed at establishing E.C.-wide safety standards, reducing regional disparities, improving worker training and enhancing labor mobility. Concerns have been expressed over other initiatives, that would have the effect of establishing more rigid E.C.-wide industrial relations policies and practices.

8) **Competition Policy** -- Establishment of E.C.-level control over mergers and acquisitions, particularly large-scale multinational combinations, is seen by U.S. companies as potentially providing an expedited means of increasing E.C.-wide competition, while producing substantial gains for the E.C. through improved economies of scale.

9) **Monetary Policy** -- The E.C. has already agreed on the elimination of all controls on capital movements within the E.C. Currently under consideration are the establishment of mandatory coordination of monetary policies and possible creation of a single E.C. central

bank and currency. These policies not only enhance the ability of U.S. companies to operate within the E.C. framework, but may also have a major impact on the E.C.'s international competitive status.

10) Potential Issues -- The report concludes by noting two other issues not now included in the EC-92 program, but which may have a major effect on U.S. companies when they are considered by the E.C. in the future. These are future rules regarding the opening of defense procurement within the E.C. and the adoption of common E.C.-wide export control policies.

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INTRODUCTION

There is no hotter subject among U.S. business leaders than the proposal to eliminate the European Community's remaining internal market barriers by 1992. Virtually every U.S. industry and major company now is trying to understand what "EC-92" means for them and for their world marketing strategies.

At this point, U.S. companies almost uniformly emphasize that EC-92 represents a major market opportunity. They see the proposed package as contributing both to a rapid expansion of the E.C. market and, in practice, to a deregulation of that market which will increase opportunities for competitive producers. Within this overall positive outlook, however, there are a series of major policy issues, the outcome of which could either enhance or reduce business opportunities for U.S.-based exporters or U.S.-owned companies already established within the E.C.

This report aims to provide guidance for NAM members on the changing European business environment. It focuses on the specific issues and proposals related to EC-92 that have been identified as being of most concern to U.S. industry, rather than the overall history, politics and economics of the E.C. internal market program. The report is based on extensive consultations by the author with NAM member firms in the United States and Europe, as well as cooperating business associations. The firms consulted in Europe include European as well as American-owned enterprises. The report is also based on information provided by representatives of the U.S. government, staff of the European Commission in Brussels and officials of E.C. member-state governments and private trade associations. The report is not a formal NAM policy statement on EC-92 issues, though it may indicate those issues in EC-92 on which NAM policy may later be developed.

The following issues are those that have been identified as being of greatest importance to American industrial exporters and investors doing business in the E.C. Each is given a separate detailed section in Part II of the report, where the most critical specific proposals and policy choices are discussed.

1) Technical and Environmental Standards
2) Public Procurement
3) Reciprocity
4) Sectoral Issues
5) Rules of Origin and Local Content
6) Intellectual Property
7) Social Dimension
8) Competition Policy
9) Monetary Policy
10) Other Potential Issues

This report refers to many texts of specific documents and policy proposals related to these issues. Precise references are provided in the report for the use of members who wish to follow up on issues in more detail. In many cases these proposals will evolve as they move through the E.C. policy process. Listed at the end of the report are some contacts in the United States and Europe which are good sources of information for U.S. companies as they seek information on the issues of most importance to them.

Organization of this Report

This report is written in two parts. The first part is a general orientation for the business reader. It summarizes the importance of the E.C. market for U.S. business, then briefly describes the development of the EC-92 proposal and the policy processes of the European Community as amended by the Single European Act of 1987 (SEA). This latter constitutional change is so-named because the E.C. member states used one negotiated instrument to amend the basic European Coal and Steel Community and Euratom treaties, a well as the Treaty of Rome that established the Common Market.

The second part of the report is based on a "watch list" of major EC-92 policy issues, whose development will be critical for the future role of U.S. business in Europe. These are not necessarily the most important or visible EC-92 issues from the member states' own political and economic perspectives, but may be the ones with the most impact on U.S. business and manufacturing interests. Accordingly, this is the range of issues which will receive most attention from NAM during the evolution of EC-92.

I. THE EVOLUTION OF EC-92 AND U.S. INDUSTRY

What Is at Stake for U.S. Industry?

Many commentators in recent years have criticized U.S. business for being too "Euro-centric," too focused on traditional and slow-growing markets in western Europe. We have been told that the future, high-growth markets are in such areas as the Pacific Basin, Latin America and other less-developed economic regions, or even the major Communist countries. These analyses underestimate the dynamism, openness and growth possibilities that remain in Europe. While U.S. exporters should seek markets wherever they can find them, for the foreseeable future the E.C. may remain the key growth market overseas for U.S. industrial companies.

Europe is our most important regional export market, and will remain so indefinitely. The value of U.S. exports to the European Community is about a quarter of total exports, a little higher then the share going to Canada. But a quarter of all U.S. exports to Canada are cars and parts involved in the two-way auto trade agreement. As for other countries and regions, Japan takes only 8 percent of our exports and the rest of East Asia another 13 percent. All of Latin America takes only 13 percent. And most importantly, no other regional market approaches the level of economic integration found in Europe today, much less what is being contemplated by 1992.

The E.C. is a critical market for many specific U.S. exports. In 1988, 46 percent of all U.S. exports of computers and parts have gone to the E.C. -- that's a projected total of over $10 billion in exports of that product to the European Community. The E.C. is also the largest market for U.S. electrical machinery and parts, a category that includes semiconductors. Total U.S. exports to the E.C. in 1988 may have hit $4.5 billion. The E.C. takes about a third of U.S. aircraft exports, with sales this year running over $6 billion at an annual rate. And in scientific and controlling instruments, where U.S. manufacturers maintain a strong trade surplus, 35 percent of all exports in 1988 went to the E.C.

The E.C. market has been the most important one so far in turning around the U.S. trade deficit. The fall of the dollar has had a bigger and faster impact on growth in exports to Europe than any other region. U.S. export growth to Europe has been near or above double figures since 1985 and has been accelerating -- 9 percent in 1986, 14 percent in 1987 and an incredible 25 percent in 1988. Since 1985 the increase in our exports to the EC, from $49 billion to $76 billion in 1988, has been roughly equal to our total exports to Japan in 1987. It's as if we have suddenly found a new export market out there the size of Japan. This export growth in 1988 cut the annual rate of the bilateral U.S. trade deficit with the E.C. in half: from $24 billion in 1987, to $12 billion in 1988. That change alone accounted for more than a third of the total improvement of the U.S. trade deficit in 1988.

Finally, let's look at investment. The total U.S. direct investment stake in the European Community is nearly $125 billion, according to official statistics. In manufacturing investment alone, total U.S. holdings in the E.C. were valued at $65 billion at the end of 1987 -- more than half the total value of U.S. companies' manufacturing investment abroad. It is more than double the amount in Canada, almost ten times the amount in Japan, four times the total for all Latin America and twelve times the total for all Asia outside Japan.

The E.C. Internal Market Program

Anything that affects U.S. economic interests on this scale is obviously of critical importance to U.S. industry and to the U.S. economy more generally. The E.C. internal market proposal -- the goal of completing the internal E.C. market and removing all intra-E.C. trade barriers by 1992 -- is probably the most important policy initiative taken within the European Community since the founding of the Common Market in 1957. This explains the extraordinary interest of U.S. business in this initiative.

It is the very failure to complete the common market as originally envisioned that has led to the development of EC-92. For example, as one American executive with extensive experience in the E.C. has explained, "On January 1, 1958, the original six members of the Common Market took down their signs at the internal borders that said 'Customs.' Then they put up new signs that said 'Taxes.'"

What he means is that differences in internal national regulations -- and not just taxes, but in other areas like technical standards and public procurement policies -- have circumscribed the benefits of a truly open and free market among the Common Market's members. As the European Community doubled in members, this problem has not become any simpler to resolve. Cross-border controls remain in place for a plethora of reasons. According to the European Commission's official study, summarized in the report The European Challenge - 1992 by Paolo Cecchini, the resulting "cost of non-Europe" may equal 3 to 6 percent of Europe's gross domestic product, or a total of $250 billion annually.

These costs were tolerable in the 1950s and '60s as the European economies boomed. There was visible progress in the initial elimination of national tariff barriers within Europe. American companies contributed to this progress by investing heavily and by bringing in their expertise in operating across a wide range of regional markets. But the initial momentum and optimism faded in the 1970s, with the energy and unemployment crises in Europe, a major growth slowdown, stagflation and the European version of the U.S. "malaise" of the late 1970s: "Eurosclerosis."

The proposal to establish a fully open internal market by 1992 is designed to sweep away the de facto obstructions to free trade within Europe. To understand the genesis of the proposal, which dates from 1985, it is necessary to understand the failures of previous efforts to eliminate internal market barriers by harmonizing national product standards and other policies. There were efforts to define specific E.C.-wide codes for goods on a product-by-product basis -- Euro-beer, Euro-bread, Euro-ice cream and so on. Progress was so slow, that it could not even keep pace with the development of new products in the dynamic European economy.

Finally, in a landmark decision the European Court of Justice declared that member governments could not use their national standards and regulations as a basis for keeping out goods that were legitimately sold and consumed in other member countries. This decision -- the Cassis de Dijon decision -- meant that E.C. member countries had to accept some expeditious means of developing E.C.-wide minimum product standards. The alternative would be goods sold in their national markets that were produced under conflicting standards or even no standard at all.

Another impetus behind EC-92 was world competitiveness. The goal of a "United States of Europe," going all the way back to Jean Monnet, the father of the European idea, was always outward-looking as well as inward-looking. Monnet wanted Europe to be a power in world economic and political affairs. By the early 1980s, it had become clear that market barriers within Europe were inhibiting the development of economies of scale sufficient to make European-based enterprises competitive in the world economy.

We also cannot forget the employment question as a major impetus for change. Unemployment rates in Europe mounted and remained stubbornly high in the early 1980s. From essentially full employment, or even "negative unemployment" in some E.C. member countries around 1970, the total estimated E.C. unemployment rate rose through the 1970s and reached double digits, 10.5 percent, in 1983. Since then, it has not appreciably fallen. It became increasingly clear to E.C. members that it was necessary to add a new structural dynamic at the Europe-wide level, and that addressing the unemployment problem solely at the national level of structural adjustment provided an insufficient solution to national unemployment problems.

The Cecchini report estimates that the total growth in E.C. GDP as a result of elimination of internal market barriers would directly create 1.8 million new jobs. This would not solve the E.C. unemployment problem, though it would at least reduce unemployment by an estimated 1.5 percent, allowing for some initial job losses due to restructuring. More importantly, as with world competitiveness, there was a perceived need to create a solution to the unemployment problem that was on a greater scale than provided within the individual member country economies. This need was compounded by the great disparities in regional development within the E.C., especially after the addition of the three lower-income Mediterranean countries in 1981-86.

In 1985 the recently-appointed European Commissioner for the Internal Market, Lord Cockfield of the United Kingdom, produced a remarkable new proposal which has revitalized the European Community. Backed by the recent decision of the European Court of Justice, the Cockfield "White Paper" proposed a target list of about 300 directives and other policy actions, aimed at eliminating effective barriers to the internal market. Taken together, these directives would:

- Eliminate all remaining physical barriers to the movement of persons and goods within the E.C.;

- Eliminate differences in national technical standards as barriers to the free movement of goods;

- Eliminate national differences in indirect tax rates as a trade barrier.

Moreover, Lord Cockfield insisted that the package was a package. It had to be achieved by a date certain -- 1992 -- or the whole process would be blocked by each member-state picking the benefits they wanted, and dragging their feet on the rest. Cockfield's program was both encouraged and fully backed by the European Commission President, Jacques Delors, who has made EC-92 his top priority. In addition, the Single European Act (SEA), specifically approved to expedite completion of the internal market, established that most internal market directives would be adopted by qualified majorities. No one member government could block directives by withholding its consent.

Prospects for Completing EC-92

EC-92 is a moving target. But this is a good halfway point at which to assess developments. Nearly half of the proposed list of directives in the 1985 White Paper have already been adopted or advanced to the final stages of approval. Due to differences with Prime Minister Margaret Thatcher over the speed of certain aspects of EC-92, Lord Cockfield has not been re-nominated to the Commission by the British government. But the reappointment of Delors as President, for the new term starting in 1989, signifies that the process will continue, with the support of the E.C. member states.

The most serious political obstacles to achievement of the EC-92 package do not necessarily involve the most salient operational issues for U.S. companies. This is important for NAM members to remember as they follow the progress of the EC-92 program. Perhaps the most difficult decisions that the E.C. will have to make on the EC-92 agenda involve U.S. interests and U.S.-E.C. economic relations only indirectly, insofar as U.S. companies and the U.S. economy as a whole have a major stake in the successful completion of the EC-92 program. Such issues include:

-- Harmonization of VAT rates;

-- Complete elimination of frontier controls on movement of persons within the E.C.;

-- Monetary policy harmonization, including the possible establishment of an E.C. central bank and single currency.

Whatever the outcome of these politically sensitive questions, which could prevent the goals of the 1985 White Paper from being fully achieved, other directives and policies related to 1992 will go into effect as they are approved by the E.C. In this sense, Lord Cockfield's admonition that EC-92 must be achieved as a complete package is misleading: those parts of the package that attain final approval will immediately begin to affect how business is done in Europe. Moreover, some European economists dispute the conclusions of the Cecchini study regarding patterns of growth. The study predicts some loss of economic growth due to restructuring problems as EC-92 begins to affect E.C. economies, followed by large gains in the mid-1990s. But other economists see more "front-loaded" growth due to new efficiencies as parts of the EC-92 package enter into effect.

On January 1, 1989, a new Commission took office in Brussels. President Delors was reappointed, but there were many important changes in the other portfolios (an updated list of the Commissioners is provided in an appendix to this report). U.S. companies should at least anticipate that a large part of the total EC-92 package will be in place by the end of this Commission's mandate in four years. During this period, the conditions for U.S. companies of doing business in the E.C. will be changed in a major and irrevocable way.

The Process of Adopting EC-92 Policies

Before analyzing in detail the major issues of EC-92 for U.S. companies, it is important that the reader have a general familiarity with European Community terms and institutions. Moreover, the fundamental relationship of the member states and organs of the E.C. has been altered by adoption of the SEA in 1987, specifically to enhance completion of the internal market. General background knowledge of the institutional relationships within the E.C. is necessary for determining the most appropriate points in the process for U.S. companies to raise questions or concerns regarding specific EC-92 proposals.

Most of the Internal Market legislative work will be carried out by three E.C. institutions: the European Commission, the Council of Ministers, and the European Parliament. These three institutions are responsible for proposing, debating and adopting Community legislation. In addition, the European Court of Justice decides on the legality of challenged E.C. legislative measures.

The **Commission** is responsible for formulating and proposing legislation and providing for the administration of Community policies. The Commission is led by 17 Commissioners (two each from France, the Federal Republic of Germany, Italy, Spain, and the United Kingdom, and one from each of the other member states.)

The Commissioners and their staff draft all Community legislative proposals and policy statements. Each Commissioner is responsible for one or more areas of Community policy, such as economic affairs, agriculture, environment and energy. The staff of the Commission are organized into directorates-general (DGs) -- there are 22 DGs at present, and they do not correspond exactly to the portfolios held by individual commissioners (see list in Appendix 1). The Commissioner responsible for the Internal Market program in the new Commission is Martin Bangemann, formerly Economics Minister of Germany. DG III is the directorate responsible for many internal market policies, but other directorates also have relevant areas of authority.

Once E.C. legislation is adopted, the Commission is responsible for implementation. If legislation is adopted in the form of a regulation, it immediately becomes law in the member state. However, most EC-92 policies are cast in the form of directives, which means that each member government must pass or have previously established national legislation conforming to the general terms of the E.C. policy. The Commission is also the executive body responsible for negotiations with non-E.C. countries and organizations in areas where member states have ceded authority to the E.C. -- notably trade policy. These contacts are handled primarily through DG I (External Relations), though other directorates are involved in some specific functional issues.

The **Council of Ministers** is the decision-making body of the Community and must approve all Community legislation. It is the only Community organization whose members act as representatives of the individual E.C. member state governments. Member governments are represented at Council meetings by the national minister who has responsibility for the subject under discussion. The presidency of the Council rotates every six months, in accordance with the "E.C. alphabet:" the alphabetical order of member state names in their respective national languages. Thus, Germany (Deutschland) and Greece (Ellas) chaired the Council in 1988, to be followed by Spain (Espana) and France in 1989. This rotation is quite important, because the national government's own priorities can heavily influence the Council agenda during its presidency.

Formerly, the Council could only take decisions on most important matters by unanimous agreement. The SEA has amended the Treaty of Rome to allow Council approval on most internal market proposals by "qualified majority" voting. This change may prove extremely important to U.S. companies, who will no longer be able to rely on one country to block changes that may disadvantage them and who correspondingly may be less concerned about individual countries that oppose favorable internal market reforms. Appendix II explains the qualified majority voting rules. Note that not even two large countries voting together or any combination of one large country and two small ones can block an internal market proposal. In certain areas, such as 1992 measures, the Council must also formally consult with the European Parliament and the Economic and Social Committee.

The **European Parliament** (EP) is comprised of 518 members, directly elected by the voters in each of the member states, roughly in proportion to the member state's population. The Members of the European Parliament (MEPs) sit in nine political party groupings, such as the Socialist Group or the European People's Party, rather than in national groups. At present, the Socialists have the largest single voting bloc within the EP, augmented by a substantial number of Communist MEPs and members of other left-wing groups. Since 1979, the EP has been directly elected by voters in the member states. The next EP election is set for this year.

The EP advises the Commission and the Council on legislative proposals before any legislation is adopted. It also exercises a measure of democratic control over the Commission and the Council through its right to amend or delay legislation. This power has been increased under the SEA, especially with regard to EC-92 issues. Specifically, the EP may amend Commission proposals, then reapprove their amended version by a two-thirds majority, if the Commission does not accept the EP amendments. The Council may subsequently only reject the EP version and replace it with its own through a unanimous vote. The EP also must approve the E.C. budget, and, importantly for U.S. interests, must ratify all E.C. treaties with non-member countries.

The **Court of Justice** (ECJ) is comprised of thirteen Judges and six Advocate-Generals, each appointed by agreement among the national governments for six-year terms. As the "Supreme Court" of the Community, the ECJ determines the validity and correct interpretation of challenged Community law provisions. A new Court of First Instance has also been established to relieve the backlog of cases awaiting decision by the ECJ.

The ECJ does not have a role in legislating individual 1992 laws as do the other three Community institutions described above. Through its legal decisions, however, it has been a driving force behind European integration generally and in several instances has forced the Member States to eliminate barriers to free trade within the Community, as noted above in the Cassis de Dijon decision, and confirmed by recent decisions regarding Italian pasta regulations, the German beer purity law and the Danish bottle law. Individuals and companies may challenge E.C. or member state policies directly in the ECJ. This is different, for example, to the GATT, where only member governments may lodge complaints against each other.

The institutional structure of the E.C. provides U.S. companies with a number of points of access to voice their concerns and opinions on EC-92 proposals:

-- Specialists within the relevant directorate of the European Commission;

-- Member state trade and industry associations, as well as the E.C.-wide employers' association (UNICE), headquartered in Brussels;

-- Functional ministries of national governments in sympathetic member states;

-- Member states' permanent delegations to the E.C., who do most of the background work for the Council of Ministers' meetings through the Committee of Permanent Representatives (COREPER);

-- Members of the European Parliament who may be sympathetic to the position of the U.S. company;

-- National E.C. member state legislatures, which must enact all EC-92 directives into specific laws.

Also, it is very important that U.S. companies should remember contacts with relevant U.S. government representatives in Washington and Brussels -- general contacts are listed at the end of this report.

II. MAJOR ISSUES FOR U.S. COMPANIES IN EC-92

1. TECHNICAL AND ENVIRONMENTAL STANDARDS

One of the major components of the internal market is the elimination of differences in technical standards, that serve as barriers to intra-E.C. trade. The issues associated with the elimination of technical standards barriers within the E.C. and the establishment of a new E.C.-wide standards process may affect more U.S. companies than any other EC-92 issue.

In view of the Cassis de Dijon decision and the Internal Market program, a wide range of technical "framework" standards are being negotiated. Community policies will put particular emphasis on certain sectors, including information technology and telecommunications, pharmaceuticals, chemicals, medical products, construction equipment and food products.

From the U.S. perspective, it should be understood from the outset that the reform of the technical standards process in the E.C. is not intended as a market-opening device with respect to non-E.C. trade partners. E.C. documents indicate that the E.C. will remain bound by existing GATT obligations related to technical standards. But the E.C. has undertaken no commitment to widen opportunities or to eliminate existing standards conformance problems for producers outside the E.C. as part of the 1992 process.

Nevertheless, the harmonization of technical standards can potentially create substantial benefits for U.S. companies -- even those operating outside the E.C. itself. Under EC-92, U.S. companies at most will need to obtain certification from only one E.C. authority for the product to be considered as duly acceptable throughout the E.C. market. In some cases, the continuation or renewal of existing international mutual recognition agreements may even mean that normal U.S. certification procedures will also allow products to be certified for use or sale throughout the E.C. But typically such agreements only exist for a limited range of products, and it is unclear how rapidly mutual recognition agreements will be developed under the new E.C. system. And the negotiation of new standards for testing procedures allow scope for the "harmonizing up" of standards to a degree that U.S. producers consider unreasonable, unnecessary or even anti-competitive with regard to world market sales.

The New E.C. Approach to Standardization

Beginning in 1983, the E.C. developed a new approach to product standardization and harmonization, which has been incorporated into the internal market concept. As succinctly summarized in Ernst & Whinney's August 1988 report Europe 1992: The Single Market, "Any product which can be sold in the member state in which it is produced will be freely marketable in other parts of the E.C., unimpeded by diverse national standards or testing and certification practices." The emphasis in this approach is on "mutual recognition and equivalence," as opposed to negotiation of detailed manufacturing and process standards. There are three main ways of introducing this new approach:

-- A 1983 directive prohibited member states from creating new technical standards through regulations that would serve as market barriers between E.C. countries;

-- A new E.C. standardization procedure was created through the New Approach to Technical Harmonization, formally agreed in 1985;

-- E.C. governments will be required to accept agreed guidelines for standards and procedures in testing laboratories. This will mean results from other E.C. countries' certifying laboratories will be accepted by all E.C. countries.

Within this approach, there is a strong distinction between "standards" (defined as voluntary specifications) and "technical regulations" (mandatory requirements imposed by law). The E.C. framework directives deal with technical regulations, where necessary, by setting essential requirements for the E.C. as a whole. The E.C. is also promoting voluntary standardization at the E.C. level, not only for the purpose of fulfilling the legislative goal of mutual recognition and equivalence, but also because common standards in general make economic sense.

How will the Community implement this approach? The basic directives are relatively general. The key question will be how they are to be translated into specific product standards recognized and accepted across the E.C. And while the emphasis may be on mutual recognition and equivalence, these evolving E.C.-wide safety and product standards may affect the manufacturing and application of covered products. For setting industry standards, the E.C. has adopted the approach of reliance on existing private Europe-wide standards institutes for general and electrical products (known by their combined abbreviations as CEN/CENELEC).

The enhanced mandate provided CEN/CENELEC by the E.C., and how this body interacts with the national standards organizations, particularly DIN (Germany), BSI (U.K.) and Afnor (France) are described in detail in the European Commission publication Common Standards for Enterprises (written by Florence Nicolas of Afnor, and published in August 1988). This booklet should be required reading for U.S. companies concerned with CEN/CENELEC, so that they understand the formal rules of the system. The goal, as expressed in this document, is that the process should develop in a transparent manner.

It is, however, far from certain that the development and implementation of standards will be as transparent as either the European Commission or U.S. industry might hope. There are serious concerns among some industries, particularly some U.S. exporters, that the process will not allow non-European comment at a sufficiently early stage to prevent the development of E.C.-wide standards as a trade barrier. An excellent brief summary of this process from the U.S. perspective, which also discusses this concern, has been written by Patrick Cooke and Donald Mackay of the National Bureau of Standards in the article "The New EC Approach to Harmonization of Standards and Certification." It was published in the Commerce Department's bi-weekly magazine, Business America on August 1, 1988, and is appended to this report.

In principle, the adoption of common standards is widely seen by U.S. companies in Europe as a major benefit. U.S. companies with production facilities in Europe believe that they will be able to rationalize production across national frontiers to a much greater degree than at present. This process will be facilitated for companies heavily reliant on road transportation by accompanying liberalization of national rules related to domestic and international trucking. U.S. exporters may achieve comparable benefits. Whatever standard is adopted for a product, the potential U.S. exporter will be assured that complying with this standard provides access to the entire E.C. market.

Despite these potential benefits, there are serious concerns that some European companies with rigid standards currently in place in their home national market will seek to protect and strengthen their E.C. market position by "harmonizing up." That means having the E.C. adopt their own national standards on an E.C.-wide basis. Such an approach would, of course, defeat the purpose of "mutual recognition and equivalence." The need to achieve consensus within the CEN/CENELEC process mitigates against such outcomes, but at present there is a high degree of uncertainty among companies about how the consensus-building process will work in practice.

There are four ways by which U.S. companies can counteract the problem of "harmonizing up" in the E.C. standards-setting process:

-- U.S. companies operating in Europe should participate fully in national and E.C.-wide standards bodies that will have access to the EC-92 standards process. This may be the only way that U.S. companies can obtain access to the standards process during the initial development phase. As non-E.C. producers may be excluded from the early (and crucial) stages of the CEN/CENELEC standard-setting process, it will be important at this stage to identify distributors and potential E.C. production partners who can serve as effective supporters of the U.S. company's position.

-- The E.C. requires CEN/CENELEC to adopt existing International Standards Organization (ISO) or International Electrotechnical Commission (IEC) standards where they exist and are appropriate. U.S. companies should insure that they are familiar with ISO/IEC standards and are prepared to implement them for products sold in Europe. But it should also be recognized that relatively few ISO standards have been developed in many product areas. Recent comments by the CEN/CENELEC chairmen indicate that this latter problem may be alleviated by trying to develop new standards initially at the ISO/IEC level, rather than starting at the E.C. level.

-- All draft CEN/CENELEC standards and specifications are now supposed to be circulated to the American National Standards Institute (ANSI) before final adoption. Concerned U.S. companies should contact ANSI for information on proposed product standards of relevance to them.

Some U.S. companies and industry associations have said that ANSI receives drafts too late in the CEN/CENELEC process to allow timely comment by non-European companies. U.S. companies should indicate to both their E.C.

contacts and U.S. government contacts if such notice is not timely enough to allow for U.S. reaction and input. CEN/CENELEC may reduce this problem through a new monthly publication listing all upcoming product standards projects.

-- In developing U.S. national standards and in participating in worldwide standards bodies, U.S. companies should seek to ensure a maximum level of conformity between international norms and national standards in Europe, North America and Asia.

One final and important note should be added on the development of standards. U.S. companies should expect a general process of upwards harmonization particularly with respect to E.C. environmental standards. Environmental concerns are now of major political importance in the E.C. This is reflected in the addition of an environmental title to the Treaty of Rome by the SEA. And Article 100a.3 now provides that "The Commission in its [internal market] proposals...concerning health, safety, environmental protection and consumer protection, will take as a base a high level of protection."

Certification and Testing

Another important question regarding the impact of new E.C. standards procedures involves the mutual recognition and equivalence of testing procedures and results. A draft November 1988 European Commission policy statement on technical specifications, testing and certification provides some clues as to E.C. plans.

The first basic question posed in the draft paper is to what degree and for what products will the E.C. require third-party testing and certification, as opposed to self-certification? The November draft paper indicates that the basic rule could be that self-certification will be applied when product design conforms to an established E.C. design standard. But "when...such standards do not exist," the paper continues, "or...the manufacturer...prefers to apply other manufacturing criteria of his own choice, the demonstration of conformity to the essential requirements should involve the intervention of a third party, either by certification or by independent third party testing."

This approach could have major implications for U.S.-based producers that provide products that probably meet essential E.C. health or safety requirements, but do not necessarily meet specific E.C. design or testing criteria. The issue has been explained thus by a U.S. chemical manufacturer:

> What is of primary concern is that the Directives and Standards flowing from those directives may either ban products for sale in the E.C....or may establish test protocols that are entirely different from those performed in the United States and would require certification that the product has been tested in accordance with these protocols...The concern on the part of U.S. chemical exporters would be the expense of running the new tests and the time lost [of]...2-5 years...This would effectively keep somebody out of the marketplace until the tests had been completed.

To address this type of problem in the past, bilateral agreements have been developed between U.S. and E.C. national or multinational standards authorities on mutual recognition of certification of products or processes. But such agreements cover relatively few products, and only some E.C. member countries. Moreover, in some cases even these bilateral agreements could be nullified by the draft proposal under consideration in the Commission.

However, the Commission's draft statement devotes little time to this important issue. It states that non-E.C. origin products will have non-discriminatory access to E.C. conformity assessment procedures under terms of the GATT Standards Code. But it also notes that the GATT "does not lay down binding obligations...[regarding] participation by foreign testing and certification bodies in mutual recognition arrangements." The paper takes note of existing bilateral arrangements only with the EFTA countries. Otherwise, it considers only the future negotiation of such recognition agreements at the E.C. regional level. The paper does state that in all areas subject to either E.C. or national legislation, no bilateral agreements by member states with non-E.C. countries are allowed, "as such agreements confer easier access for third countries to the common market, which is a matter of common commercial policy under Article 113 of the [Rome] Treaty."

In summary, the E.C. attitude to international mutual recognition agreements will depend on whether products are subject to legislated regulations. If they are, mutual recognition agreements will have to be concluded by the E.C. and bilateral agreements will have to be renegotiated. Otherwise, the issue will be a matter for the private sector, and existing bilateral international agreements will be of no direct concern -- they will be neither enforced nor nullified by the E.C.

The conditions for negotiating future E.C. bilateral recognition arrangements with non-E.C. trading partners are summarized in the November draft statement as follows:

-- The E.C. must be assured of the technical competence of the non-E.C. partner;

-- The agreement must secure reciprocal benefits;

-- Participation in the agreements is limited only to testing and certification bodies actually conducting the tests or issuing the certificates.

Even receiving the new "CE" mark may still not be enough to assure a company that its product will have clear sailing throughout the E.C. market. Concerns have been expressed in Europe that only products meeting national standards criteria and receiving national standards body labels can still be sold in some markets. For example, insurability rules can be used to keep out products not meeting a specified national standard. To ensure adequate preparation for the EC-92 market, U.S. companies should now identify obstacles related to the national application and use of standards that may inhibit E.C.-wide distribution of even those products that conform to new E.C.-wide standards. Then the next step will be to identify potential E.C. and U.S. support for the elimination of such effective barriers.

2. PUBLIC PROCUREMENT

One of the most far-reaching proposals in the 1985 internal market package dealt with public procurement. The Cecchini report on the economic cost of "non-Europe" calculates that public sector purchasing is equal to 15 percent of the Community's total gross domestic product, or a total of about $600 billion. Currently, just 0.14 percent of GDP, or less than $1 billion worth of goods and services, is purchased from E.C. companies outside the purchasing country's national territory. This shocking statistic lies behind the Commission's drive to open national public sector procurement markets to intra-E.C. competition.

While E.C. directives on public works and supply contracts are currently in force, these are generally perceived as weak and ineffective. Completing the internal market will require government procurement to be based on fair competition as opposed to national identity. This process is effectively to be completed in two steps:

1) Improving existing directives on public works and public supply contracts. The new public supply contracts directive was approved in final form by the Council of Ministers on March 22, 1988 (Directive 88/295/EEC). An amended proposed directive on public works contract procedures was submitted to the Council of Ministers on June 21, 1988, following receipt of proposed amendments from the EP. The Council has adopted a "common position" on this draft directive, indicating general agreement on substance, and the directive should be approved in final form within the next year.

These two directives work in a similar way. The bidding process in each country must be made completely transparent, with the elimination of single-bid or no-bid contracts without adequate public notice. This will be achieved by changes in contract notification procedures. In addition, the legal powers of the Commission to nullify contract awards will be strengthened. It is anticipated that in most cases these powers will be used on an advisory basis with respect to member state governments, before actual contract awards are made.

2) More controversy has been aroused by the other major initiative, the proposed extension of open public procurement rules to previously excluded sectors -- telecommunications, water, energy and transport. The Commission's formal proposals in this area have only recently been announced, in three documents issued on October 11, 1988:

- Proposed directive on procurement procedures of entities providing water, energy and transport services;
- Proposed directive on procurement procedures in the telecommunications sector;
- Communication explaining the Commission's policy proposals in these two areas.

The most important point for U.S. companies is that these proposals create no new rights of access to the E.C. public sector market for products made outside the E.C. The Commission notes in parts II.D and III.F of the October 1988 communication that these sectors are generally excluded from the E.C.'s GATT obligations, therefore, "...Contracting entities are placed under no obligation to apply the provisions of the Directives to offers having their origin outside the Community."

To determine whether a product is covered by these proposed directives, the Commission proposes a 50 percent "local content" test: "...An offer is considered having its origin outside the Community when more than half its value represents goods or services produced or performed outside the Community." This local content rule is subsequently ameliorated for companies with investments in Europe by a broad definition of what may be included as local content: "...In the case of offers from subsidiaries or agents, a substantial part of the value of the offer may represent economic activity within Member States, and can thus be considered of Community origin."

The proposed directives also would create a positive requirement to discriminate in favor of E.C. suppliers over non-E.C. source suppliers, when the cost difference is 3 percent or less of the contract value. There is no sliding scale, so that a 50-percent E.C. content proposal, for example, is just as "European" as an 80-percent E.C. content proposal.

The justification for these actions that frankly discriminate against foreign trade is that the primary beneficiaries of EC-92 should be industry in the E.C. The Commission states that, "First, provisions are needed to defend the Community's commercial interests and preserve its negotiating position by making no unilateral concession but on the contrary creating a positive incentive for third countries to give guarantees of equal access to similar markets." The 50 percent E.C. content threshold and the contract bid margin have obvious precedents in U.S. "Buy-American" legislation. "Second," the Commission paper continues, "Community producers should, where necessary, be given the necessary time for the industrial adaptation required to meet the objectives of 1992 and the day when reciprocal access is finally agreed."

Thus the local content rule on public procurement in the excluded sectors is part of a strategy not just to protect E.C.-based producers, but also to force open public procurement markets internationally. The Commission is also seeking the power for itself and the Council of Ministers to grant other countries access on equal terms to public procurement in the excluded sectors, upon reaching agreement "through bilateral or multilateral negotiations" assuring equal access for E.C. producers in the trading partners' markets. But since it is not clear how successful this strategy will be, the proposed Commission policies will in the meantime perform the second task, that of "providing necessary time for industrial adaptation," or, in other words, protection for developing and restructuring industries.

Insofar as the GATT is concerned, the primary focus of such negotiations would not be the Uruguay Round, in the Commission's view, but rather negotiations among present GATT Procurement Code signatories on expansion of the code. This would have the advantage of including only countries that have already accepted the principles of such a code. It would notably exclude the less-developed countries. Of course, progress in the Procurement Code could always become part of an overall GATT package that includes the Uruguay Round results. The question of trade reciprocity and EC-92 will be discussed in a broader context in the next section.

Until any reciprocal access agreements are negotiated, the E.C. policy might also be construed as conflicting with the telecommunications provisions of the U.S. Omnibus Trade Act of 1988 (Secs. 1371-1382). This subject will be examined under the telecommunications heading in Section 5 below.

There are two other features of the procurement directives for the excluded sectors which should not be overlooked by companies:

-- First, the directives require that specifications in a contract must be in conformity with existing European standards, except that an indefinite waiver is provided when the contracting authority can show incompatibility with existing national systems and equipment or "disproportionate cost" in effecting a changeover to E.C. standards in the contract. The Commission staff's present expectation is for any such protection to diminish rapidly, to disappear in three to five years.

-- Secondly, the procurement directives in the excluded sectors do not apply to public purchasing authorities per se, but rather to monopoly providers of public services in a country or region -- whether these suppliers are themselves publicly or privately owned. Thus, for example, British Telecom (private) is included as a "contracting entity" as well as the publicly-owned Deutsche Bundespost network or the French PTT. This provision broadens the definition of public procurement, in an era of the privatization of publicly-owned monopoly entities.

This point also could have negative consequences for U.S. companies, depending on the E.C.'s interpretation of the concept of reciprocity of market access. Access to contracts for publicly-owned telecommunications or power projects in the E.C. would depend on the E.C.'s interpretation that their companies (whether in Europe or the United States) had equivalent access to such contracts in the United States, even if most of these contracts are privately let. For example, one large European-owned telecommunications company provided the opinion that such U.S. entities were indeed already open to E.C. equipment sellers to the degree envisioned in these directives -- but another company emphatically held that they were not.

The initial prognosis with respect to the opening of public procurement contracts is that it will proceed slowly, characterized by an interaction of political pressure with the demands for creating a more efficient public services infrastructure compatible with the objectives of EC-92. There is a consensus among both E.C.-owned and U.S.-owned companies in Europe that the proposal will not worsen U.S. companies' existing access to a public procurement market that is highly protected by member state governments and that the process could achieve some increased opportunities for U.S. firms with an investment presence in Europe. It also should be emphasized that, within the E.C., the proposed rule creates an option as far as considering U.S.-content bids are concerned. No purchaser is obliged to set aside a U.S.-origin bid, whatever the level of its E.C.-content.

On the negative side, the explicitly protectionist "buy European" provision will probably be accepted in some form. Some U.S. industries have indicated that the 3 percent margin rule will be a substantial handicap. More generally, the adoption of an explicit local content standard combined with the restriction of public procurement liberalization to E.C.-source products and services is an unfortunate step. It could establish a new and perhaps significant trade barrier between the E.C. and other countries, at the same time as the E.C. and its trading partners are seeking liberalization of trading rules in the GATT negotiating round, and national governments around the world are weighing the advantages of protectionist versus liberal trade policies.

In this environment it is important for U.S. companies to realize, as many already have, that major multinational alliances designed to gain access to public procurement markets in the E.C. could precede, not follow, the effective implementation of EC-92 directives. For example, the last two years in the telecommunications and electronics sectors have seen:

-- The acquisition battle among Siemens, AT&T-Philips and Ericsson for the second-ranking French public network telecommunications equipment supplier;

-- The announcement on February 13, 1989, of a partnership between AT&T and publicly-owned Italtel of Italy in the development and marketing of public and private telecommunications equipment for Italy, Europe, the United States and other markets;

-- The joint GEC-Siemens hostile takeover bid for Plessey, the British defense contractor and electronics firm, a battle in which the U.S. firm General Elective has also played a major role;

-- The IBM-Siemens joint venture in the marketing of private business exchange switching equipment.

The apparent lesson, for U.S. companies who wish to be competitive if the public procurement market opens up, is that it may be risky to await the shakeout of European suppliers or the full opening of the market to outside producers through negotiated trade agreements. Within the excluded sectors public procurement market, the first essential move may be the establishment or strengthening of local ties through the company's own E.C. base and through close relationships with E.C. producers.

3. RECIPROCITY

No issue has been of greater concern to the U.S. public regarding EC-92 than the question of reciprocity and whether the E.C. is seeking to construct a "Fortress Europe." This subject has already been broached in the previous section on public procurement; in the fourth section we will look in more depth at trade reciprocity aspects of policies in specific sectors which are of particular commercial policy interest in the E.C. This section will look at the more general evolution of the reciprocity issue.

In recent months, the outgoing E.C. Trade Commissioner, Willy de Clerq, has stated several times that any opening of the E.C. market to foreign firms would have to be matched by reciprocity in their markets for E.C.-based companies. These remarks contributed to a high level of international concern that the internal market meant the E.C. was retreating into a "Fortress Europe." Foreign access would only be granted on the basis of specifically negotiated bilateral reciprocal agreements. Concern over such an evolution of E.C. policy has been openly expressed here by the Secretary of Commerce and high-level representatives of the State and Treasury Departments.

This concern is amplified because the United States and the E.C. are also participating in the Uruguay Round negotiations on changing the rules in the GATT, the multilateral international trading system. The current commitment is to complete the GATT negotiations by 1990. But it is hardly likely that the E.C., which negotiates as a unit in trade issues with the rest of the world, will make any GATT commitments that would run afoul of its own evolving EC-92 policies on, for example, state subsidies, public procurement, local content and sectoral trade issues.

Another key issue is the question of the rights of foreign-owned enterprises operating in the E.C., in view of the reciprocity policy and Article 58 of the Treaty of Rome. Article 58 provides that any company organized to do business within the EC -- without any explicit statement as to ultimate parentage of the company -- shall be considered as having the same rights under the treaty as a "natural person." The reciprocity approach -- particularly as framed in the draft Second Banking Directive of June 1988 -- seemed to call into question retrospectively the rights of U.S. subsidiaries established in the E.C., if it were determined that their home government did not provide "comparable market access" to E.C.-based enterprises. Reports that the Commission's Legal Service was being asked to review the application of Article 58 to foreign investment within the E.C. added to these concerns, even though no final report on this issue has been produced.

In an important statement issued on October 19, 1988, the Commission sought to define more clearly its position on the general question of reciprocity and related specific issues. The Commission took the unusual step of publicly declaring the outcome of an internal "policy debate" within the Commission itself in this statement, entitled Europe 1992: Europe World Partner. The statement sought to reassure trading partners that "1992 Europe will not be a fortress Europe but a partnership Europe."

On the general issue of reciprocity, the Commission undertook a fundamental definition of this term. The statement emphasized the E.C.'s existing international trade commitments as well as a commitment to achieve further liberalizations of market access through GATT multilateral negotiations -- but maintained that "It would be premature to grant non-member countries automatic and unilateral access to the benefits of the [E.C.] liberalization process before such new agreements exist." This was a restatement of the basic position of no automatic extension of benefits, without reciprocal rights for E.C. producers in the trading partner's home country.

But the statement followed with an important series of qualifications regarding the meaning of reciprocal access:

-- The E.C. seeks "similar...or at least non-discriminatory opportunities in [foreign] firms' home countries..."

-- "Nor does reciprocity mean that the Community will ask its partners to adopt legislation similar to its own."

-- The E.C. will not seek "sectoral reciprocity based on comparative trade levels, this being a concept whose introduction into United States legislation has been fought by the Community."

The key, in other words, was the general existence of fair and "comparable" market access (a term used in the U.S. International Banking Act of 1978), not mirror market-opening legislation. There would appear, for example, to be leeway for accepting that U.S. state regulations against interstate banking should not be used to bar U.S.-owned banks from acquiring branches across national boundaries in the E.C., as long as the U.S. rules were applied in the same manner to domestic and foreign-controlled banks.

Such an interpretation would conform to the important principle of national treatment. This principle means the treatment of foreign enterprises on the same basis as domestic enterprises and in accordance with international law. It has increasingly gained support as a major principle of international law, in bilateral treaties, in policy positions of the multilateral Organization for Economic Cooperation and Development (OECD) and in U.S. international economic policy positions.

On the other hand, the E.C. would not extend non-discriminatory or "national" treatment to companies in cases where the non-E.C. host government does not provide equivalent non-discriminatory access. For example, blatant discrimination against foreign suppliers through such laws as the Buy American Act would mean that U.S. exporters could not fully participate in the opening of the E.C. public procurement market.

The October 19 statement added a number of important clarifications under the heading of "specific aspects" of application of the policy. Some of the more significant ones for U.S. industry can be summarized as follows:

External aspects of the removal of physical frontiers (quotas): This subject is not, strictly speaking, a reciprocity issue, though obviously a matter of great importance to the E.C.'s trading partners. The statement promised that "Completion of the single market will mean the removal of quantitative restrictions and will require unified [i.e., E.C.-wide] import rules in respect of non-Community countries. It is possible, however, that in a number of sensitive spheres, national measures will have to be replaced by Community measures." As will be shown in the next section, this particularly refers to automotive quotas. In such cases, the Commission promises, "These measures will not result in a higher level of protection than at present."

Technical standards and public procurement: The Commission reemphasized that the program in these areas would completely respect existing international obligations. As far as standards are concerned, this includes adoption of existing international standards as E.C. standards, where applicable. But both the mutual recognition of testing and certification procedures and access to public procurement in those sectors excluded from GATT agreements would have to be the subject of future negotiations.

Capital movement and financial services: The Commission reaffirmed the principal of erga omnes regarding capital flows, which means free movement whatever the source or ownership of capital within the E.C. (see Section 9 below). The Commission also established some important qualifications regarding the proposed Second Banking Directive and Article 58 concerns of U.S. companies. While indicating possible restrictions on "newcomers" based on reciprocity of access, the Commission stated that "...There can be no question of depriving the subsidiaries of foreign firms already established in Community Member States of the rights they have acquired."

Competition policy and takeovers: In view of the proposed E.C. regulation on competition policy discussed in Section 8 below, the Commission made an extremely significant statement that could have some implications for U.S. companies. It noted that, "Should any Community rules on takeover bids be drawn up, the possibility of including provision for obtaining comparable conditions for Community firms in the non-member country concerned should be considered in cases where a firm from a non-member country is the purchaser."

The general statement on reciprocity has helped reassure U.S. companies presently operating in Europe that they will not be the target of a general "Fortress Europe" policy, which uses U.S. companies in the E.C. as hostages to insure access for the E.C. on totally equal terms in the U.S. market. But the statement is not a blanket endorsement of the national treatment principle -- even though all member states of the E.C. have individually endorsed this principle by signing the 1976 OECD national treatment declaration. And the E.C. has not clearly indicated that it will apply Article 58 as an unqualified basis to future establishment of foreign-owned enterprises in the E.C.

The E.C. has not abandoned its general philosophy of reciprocity as an approach to solving the problem of how to ensure that producers in the E.C. are the primary beneficiaries of EC-92. How this policy may be applied in some important specific sectors is the focus of the next section of the report.

4. SECTORAL ISSUES

A major subject within the EC-92 program is the effect of internal market liberalization on E.C. trade and competitiveness in specific commercial sectors. Generally, the E.C. is moving toward a common commercial policy in such sectors, which means not only liberalization of the internal market, but a common external trade policy, including elimination of remaining national trade barriers against non-E.C. goods. The battle over reciprocity in particular may be mostly fought over such specific sectoral trade issues. All commercial sectors may be affected in varying degrees, but three sectors especially illustrate the broad scope of the policies and practices that will be changed due to the impact of the EC-92 program.

a) Automotive Trade

The "globalization" of existing E.C. national quotas is perhaps the most politically explosive subject on the EC-92 agenda, both among member states and in trade relations with the rest of the world. A U.S. auto company executive in Europe explains why in the following estimate:

> Without quotas and assumed politically motivated restraints in some countries, the overall Japanese share of the European new-car market could rise from the current 11 percent to as high as the 30 percent that we see in North America. That shift would threaten perhaps ten major assembly plants and as many as 300,000 jobs in Europe.

Some E.C. countries, such as Germany and the Benelux countries, maintain no quotas on Japanese car exports to their markets. The U.K. maintains only an informally negotiated industry-to-industry "gentlemen's agreement." This effectively holds down the level of imports to around 11 percent. Also, Japanese companies have been required to meet a local content standard if they are to receive regional aid, and if vehicles from factories in the U.K. are not to be counted against the voluntary restraint agreement. France uses its vehicle registration procedures to keep Japanese imports to 3 percent of the market, while Italy and Spain allow only a small, specified number of units, under quotas registered with the GATT. Thus, not only quota levels but the nature and implementation of the quotas vary significantly among the E.C. member states.

No decision has been taken regarding the harmonization of Japanese car quotas. The French government and automobile industry have pressed for an E.C.-wide quota, with an 80 percent local content standard to prevent Japanese evasion of the quota through assembly operations. Both the German government and car industry have opposed such a stringent quota and local content policy. At this point, only two principles appear relatively certain:

-- There will be some type of E.C.-level restraint;

-- In principle, any restraint will be temporary.

In 1988, the Brussels-based European carmakers association (CCMC - representing all major E.C.-owned companies) did adopt a common industry position. This position called for the stabilization of total Japanese exports to the E.C., at least until E.C. car exports to Japan reached half the level of Japanese exports to the E.C. CCMC called for establishment of an 80 percent E.C.-content standard to determine whether cars made by Japanese producers should count against the number of units included in the stabilization agreement. But under pressure from German companies this common position is currently being reassessed in view of the question of the impact on automotive trade with the United States.

The automotive quota issue is of major concern to U.S. interests for a number of reasons. The two largest U.S. car manufacturers have extensive operations in the E.C. and are among the six companies that hold roughly coequal leading shares of the mass market. At present neither company is actively supporting tough E.C.-wide quotas on Japanese cars. In fact, there is serious concern in Europe that Ford and GM could potentially cooperate with Japanese companies in exporting U.S.-assembled "transplants" into the E.C., to take advantage of low dollar-based costs and avoid any E.C. quotas on vehicles shipped directly from Japan. There are strong disagreements within the E.C. car industry on how this issue should be handled. For its part, the U.S. government has not so far indicated that it would accept any E.C. effort to transfer national E.C. car quotas to a global quota, especially if such a quota were made to apply to goods shipped from the United States.

b) Telecommunications

No issue in EC-92 is thornier than its application to the telecommunications sector. A more efficient, less nationally-oriented and more internationally competitive telecommunications services and equipment sector is viewed as perhaps the crucial link in creating a more integrated E.C. internal market. The Cecchini study reports estimates of telecommunications equipment costs across the E.C. as being 80-100 percent higher than in the United States, with costs of business customer services typically higher by a similar proportion.

The strategy of the Commission is set out in its basic document on telecommunications policy, the "Green Paper" of June 30, 1987. One year later, the Council of Ministers approved a resolution explicitly linking development of a common market for telecommunications services and equipment to the EC-92 program. The telecommunications policy for the Commission is developed within a self-contained telecommunications directorate, DG XIII.

The Green Paper in fact represents a compromise between the traditional European concept of publicly-owned basic telecommunications network services and the newer international trend of establishing a free (or at least freer) market in services using the basic network and the equipment that can be linked to it. Basic services, redefined in the Green Paper as the "reserved services," are those which will be provided by Government-owned or government-licensed telecommunications monopolies, based primarily on the principle of universal access and availability. Traditionally, this has clearly included telephone and telex service.

"Competitive services" are defined as including not only the manipulation and processing of data carried on the basic network, (the so-called "value-added" services) but also providing "intelligent networks" that handle communications according to a customer's own needs, often on equipment that the customer may have purchased and installed from an independent vendor. Another key compromise in the Green Paper is that the national telecommunications administrations (PTTs) would be allowed to participate in the competitive services market, while retaining their regulatory and reserved services functions.

To implement this policy, which leaves the "integrity" of the national basic services network intact, while encouraging the competitive stimulus of alternative equipment and services providers, the E.C. has adopted or proposed a number of specific steps. The development of these specific policy initiatives will be crucial for U.S.-owned companies that hope to be competitive in the evolving E.C. telecommunications market for both services and equipment:

-- Opening of telecommunications procurement. This issue was discussed in the previous section on public procurement. In addition to the comments above, it should be noted that the draft directive of October 1988 requires a compulsory public and international call for all works and supply contracts. This includes a compulsory annual information notice announcing all intended purchases for the year ahead. Also, as with existing procurement directives, there is a requirement for full transparency of the purchasing behavior of the telecommunications entities in E.C. member states.

The E.C. policy does not initially address continued discrimination against non-E.C. source products and services. It does allows member countries at their discretion to entertain competitive non-E.C.-source bids. And, as mentioned earlier, it indicates that the E.C. intends to negotiate bilateral and multilateral market access agreements.

The policy apparently conflicts with the telecommunications reciprocity provisions of the U.S. Omnibus Trade Act. Section 1374 of the U.S. law provides for the citation by USTR of those foreign countries denying equivalent market access to U.S. firms. In an announcement of February 21, 1989, the USTR stated that this provision at present includes some E.C. countries. The draft E.C. procurement directive would in principle ameliorate the current situation by guaranteeing equal access for those U.S. firms operating in the E.C., which provide products and services meeting the E.C. local content standard. However, the U.S. Trade Act provisions are also concerned with improved markets for U.S. exports, which would not be enhanced by the provisions of the draft telecommunications procurement directive, unless E.C. member states decided to accept U.S.-source bids.

Accordingly, the Office of the USTR identified the E.C. (along with Korea) as a "priority country" for negotiations involving telecommunications market access, as provided by the Trade Act. This decision is directed at existing market barriers to U.S. products and services. The USTR announcement does indicate that the degree of access varies considerably within the E.C.

-- Provision of terminal equipment and telecommunications services. In addition to the effort to open the public procurement market, the E.C. has already adopted a directive requiring member countries to eliminate all exclusive and special rights to telecommunications entities for the importation, marketing, connection and maintenance of telecommunications terminal equipment. The terminal equipment directive entered into force on May 16, 1988. But France has challenged the validity of this directive before the Court of Justice, on grounds that the E.C. has overreached its treaty authority. Meanwhile, there is a similar draft directive under discussion that would require member countries to eliminate exclusive or special rights granted to telecommunications entities for the provision of "non-basic" telecommunications services.

-- European Telecommunications Standards Institute (ETSI). In conjunction with CEN/CENELEC, this body will establish agreed European standards for telecommunications equipment and services. The significance of ETSI is that it removes this function from the exclusive control of the European Conference of Postal and Telecommunications Administrations (CEPT), a collaborative body consisting solely of PTTs. CEPT will participate in ETSI standard-setting, but ETSI will also include other equipment and services providers, and user groups. ETSI, located in the south of France, began functioning in April 1988. All E.C. member state telecommunications authorities are now required to use agreed European standards as the basis for type approval of telecommunications terminal equipment.

-- E.C.-sponsored research on common standards in advanced technologies (RACE and ISDN). The Council of Ministers in 1986 approved a non-binding Recommendation on the coordinated introduction of an Integrated Services Digital Network. This will allow Europe-wide voice, video and data capabilities via the national telecommunications network. In December 1987, the E.C. also approved the "main phase" of the RACE project, RACE being an acronym for a program of pre-competitive R&D aimed at creating common standards in Europe for integrated "broadband" voice, video text and graphics communication. The main phase of RACE (to be completed by 1992) is open to the European subsidiaries of U.S. companies.

-- Open network provisions (ONP). The Commission is currently preparing a directive on the conditions of access to networks. An initial proposal was approved in December 1988.

c) Information Technology and Advanced Electronics

The E.C.'s collective sense of inferiority regarding telecommunications equipment and services extends to information technologies more generally. While there are many excellent and world-class E.C.-based companies in this broad field, most observers believe that the E.C. lags behind both the United States and Japan in many key areas, and that the balkanization of the E.C. market has been a major cause of this lag.

On the other hand, the E.C. seems more committed as a matter of policy to ensure that it retains a competitive base in the information technologies and electronics products industries -- across the board from chips to consumer products. There is a strong sense among many E.C. companies and other groups that the U.S. policy of opening its consumer electronics and telecommunications equipment markets to foreign producers, without adequate safeguards against import surges, dumped goods and predatory pricing, and without requiring reciprocal access, was a major mistake.

It would be wrong, however, to indicate that there is a complete consensus within the E.C. as to the policy measures needed to improve E.C. world competitiveness in the advanced electronics industries. In this report, we will focus on one particularly significant E.C.-sponsored research program -- ESPRIT -- both as a guide to the E.C.'s overall policy direction and to the relationship with U.S. interests.

ESPRIT is the acronym for the European Program for Research and Development in Information Technology. ESPRIT was established in 1984 to promote precompetitive intra-European technological research cooperation on information technology projects with commercial applications. The program provides matching funds (on a 50-50 basis) for approved precompetitive research projects selected from corporate, academic and government research laboratory proposals.

The first phase of ESPRIT, with a total budget of 1.5 billion ECUs (nearly $2 billion), was completed by 1988. To quote from a recent article on ESPRIT by Jonathan Todd in the May 1988 issue of the E.C. Delegation magazine Europe, the program "concentrated on microelectronics, advanced information processing systems (including software) and application technologies, including computer-integrated manufacturing and office systems." The Council of Ministers was sufficiently impressed with the results of the program to double its budget for the period 1989-93.

U.S. companies in Europe have been concerned that the goals of ESPRIT may be more oriented to improving the competitiveness of E.C. firms, rather than E.C.-based industry. This is perceived by some companies as reducing the opportunities for participation by U.S. firms operating in Europe. For example, the Todd article, which summarizes numerous projects, fails to mention any non-E.C. firms, even though U.S. companies operating in Europe played important roles in some ESPRIT projects. Similarly, some U.S. companies operating in Europe, that have developed proposals relevant to ESPRIT and other E.C.-sponsored research programs, have been informally advised to allow E.C. companies to take the lead in proposing such projects to insure approval.

Heightening this concern over possible current "second-class status" for U.S. companies' participation in some E.C.-sponsored research programs is the fear, mentioned by at least one U.S. company, of an E.C. backlash against similar tendencies in U.S. government-supported programs in semiconductor and superconductivity research. Sources in the Commission note that Sematech and MCC remain closed to E.C.-owned, U.S.-based companies. If this "model" is pursued, they argue, in combination with Defense Department research that remains mostly closed to E.C. companies, then questions of mutual levels of access will increase on the E.C. side.

The primary consequence of exclusion of U.S.-owned firms from such officially-sponsored E.C. research could be in the standards area. One example may be seen in the Todd article, which cites, "'Herode,' a highly successful ESPRIT project led by Siemens, [which] developed a new international standard for office documentation architecture (ODA), now officially adopted by the International Standards Organization (ISO 8613). Siemens has been joined by ICL, Olivetti and Bull on a new project to develop practical applications for ODA, which must compete on the market against IBM's DCA/DIA standard." But, in fairness to the E.C., it should be noted that there are many ambiguities regarding competition and cooperation in these evolving information technology fields. For example, the Commission cites the fact that IBM Germany does have a minority participation role in the ESPRIT II ODA continuation project.

The general development of E.C. standards in information technology is proceeding through the application of the principles of Open Standards Interconnection (OSI). All U.S. companies with an interest in the E.C. market should become familiar with the E.C.'s OSI process. With the support of the E.C., an informal European Workshop on Open Standards (EWOS) has been established for the purpose of coordinating input from standards bodies, user groups and manufacturing organizations to develop E.C. standards in the evolving information technology field. EWOS is also to discuss standards issues with equivalent U.S. and Japanese groups. At the same time, OSI-based procedures for product testing and certification are also being established.

5. RULES OF ORIGIN AND LOCAL CONTENT

The previous sections raise a number of general questions about local content policies in the E.C. and rules of origin. These will be important issues in the context of the overall development of the EC-92 program. At present, the E.C. does not maintain a general local content policy. And rules of origin for non-preferential trading partners, such as the United States and Japan, are based on a rule adopted in 1968. This states that origin is conferred in the country where the last substantial process or operation that was economically justified was performed, providing also that a new product was thus created, or at least a major new stage in the manufacturing process resulted. This rule is similar in nature to the "substantial transformation" test used by the United States.

Since then, the E.C. has considered and adopted criteria to determine the last substantial operation for a number of specific products, such as radios, televisions, tape recorders, textile products, ceramic products and roller bearings. Currently, decisions are being made regarding rules of origin for semiconductors and copiers. As the subjects of these "rules of origin" decisions become more numerous, the concern is increasing that a de facto local content policy will emerge.

Local Content Rule for Antidumping Enforcement

The E.C. does maintain percentage content rules in some specific cases. Perhaps the most important example of such rules is the 40-percent local content rule applied to companies found to be dumping or illegally subsidizing exports to the E.C. market. An E.C. regulation of July 1988 (EEC 2423/88) on application of antidumping or countervailing duties addresses the problem of "screwdriver" plants -- that is, final assembly operations that may be established to circumvent E.C. anti-dumping penalties. This regulation provided that anti-dumping duties could be applied to products whose final assembly was in the E.C. The penalty can be applied to goods shipped under the following conditions:

- Assembly is carried out "by a party which is related or associated to any of the manufacturers whose exports of the like product are subject to a definitive anti-dumping duty..."
- The "value of parts and materials" produced in the country of exportation subject to the anti-dumping rule is more than 60 percent.
- The assembly operation is started or substantially increased after the anti-dumping investigation was opened.

This 40 percent rule can be ameliorated by the possibility of including costs of "research and development carried out in and the technology applied within the Community." According to Commission staff sources, the E.C. has in practice reached accommodations with related assembly companies in "virtually all anti-circumvention cases." At the current time, there are no duties being levied at the premises of assemblers in the E.C.

What is especially important from the U.S. perspective is that the the terms of this regulation could apply to production arrangements in third countries. However, the

40-percent content rule is not necessarily an E.C. content rule. Paragraph 5 of the regulation states that, "Where a product is imported into the Community from more than one country, duty shall be levied...on all imports of such product found to be dumped or subsidized...other than imports from those sources in respect of which undertakings have been accepted." (Emphasis added.)

Rules of Origin Applied to Goods from EFTA and ACP Countries

Members of the European Free Trade Association (Norway, Sweden, Iceland, Austria, Switzerland and, by associate status, Finland) have a reciprocal free-trade agreement with the E.C. The rule of origin applied to EFTA goods with respect to eligibility for free access to the E.C. market is 40 percent EFTA country content. This same level of local content is applied to goods shipped to the E.C. from over 60 African, Caribbean and Pacific area developing countries (ACP), which have a one-way (non-reciprocal) trade agreement with the E.C. under the terms of the Lome Convention. These are preferential access agreements, and the content standards applied to goods shipped to the E.C. from EFTA and ACP trade partners have, at present, no implication for more general trade and investment relations with other non-preferential trading partners.

E.C. Content and Rules of Origin under EC-92

No general guidelines for local content rules have yet been developed in EC-92 proposals, beyond those already discussed in detail with regard to public procurement in the excluded sectors. This comment includes the areas for which reciprocal access agreements may be considered. Other areas where such rules may be considered and developed notably include the question of harmonized rules governing state aids and subsidies to investors, particularly in economically depressed regions and industries. This may require a decision regarding minimum levels of local content for an industry to be eligible for such assistance, an issue which has already arisen, for example, in the case of U.K. regional aid for the Nissan "Bluebird" factory in Sunderland.

EC-92 is not proceeding in a vacuum, but at the same time as the GATT Uruguay Round. Local content rules are prominent among the issues being discussed at the GATT, principally in conjunction with efforts to address trade-related investment measures. The E.C. has in generally supported the U.S. view that such measures should fall under GATT restrictions or prohibitions. It is a concern of both U.S. industry and the U.S. government that the evolution of E.C. policy, particularly in establishing E.C.-wide rules to harmonize existing national practices, should not conflict with the progress made in expanding GATT discipline over local content rules and policies.

6. INTELLECTUAL PROPERTY

The adequate protection of intellectual property rights is a major concern of both NAM member companies and U.S. international economic policy. A quick glance at the official U.S. balance of payments statistics reveals why. In 1987 -- the last year for which complete data are available -- U.S. companies reported earning over $9 billion from foreign sources in licensing fees and royalties, while paying foreigners only $1.3 billion. This 7:1 ratio remains the most asymmetrically positive component of the U.S. current account balance. It explains the major national interest, for example, in achieving a provision on intellectual property rights as a major goal in the current GATT negotiating round.

E.C. companies and member states also have a strong interest in protecting intellectual property rights, both internationally and within the E.C. context. The effort to achieve an improved and harmonized system of intellectual property rights within Europe antedates the 1992 internal market program, though the effort remains incomplete and unfinished. For example, an E.C. Patent Convention was signed in 1975. However, as of late 1988, five of the smaller or newer member states (Denmark, Ireland, Spain, Portugal and Greece) still had not signed the convention. A European Patent Office, with membership extending to many non-E.C. European countries, has been established in Munich. Completing and improving a harmonized E.C. intellectual property rights system is seen as an important task if a more integrated internal market is to be achieved. It is also considered essential to the development of world-class competitive technologies across European national borders.

A summary of some of the major intellectual property initiatives and their present status follows. It is largely based on information provided in the latest Business Guide to EC Initiatives, published by the American Chamber of Commerce in Belgium (see appended guide to information sources).

Regulation on Counterfeit Goods (adopted 1986 by Council of Ministers, entered into force January 1, 1988). This regulation established an E.C.-wide policy to allow the confiscation of counterfeit goods imported from third countries, thus preventing their circulation and sale anywhere within the E.C. The regulation, it should be noted, applies only to goods which infringe registered trademarks. The regulation could be enlarged to include other intellectual property rights such as copyrights in 1991.

Regulation on Community Trademark and Community Trademark Office (consolidated text including member state reservations before Council for final action). This could establish a central E.C. Trademark Office in Madrid, with a Board of Appeal in Luxembourg, the seat of the ECJ. It would eliminate the present need to register trademarks in each of the ten separate national jurisdictions (Benelux presently maintains a single system for those three countries) -- though these national systems would not be eliminated.

Benefits for U.S. companies could include the elimination of national compulsory use rules, since once the trademark has been used in one member state, it would be valid throughout the E.C. Also, recognition of an infringement in one member state could also be extended to prevent use in all other E.C. markets. But the current E.C. proposals contain provisions that could create some potential disadvantages for U.S. companies. These include a proposed cumbersome search procedure and the possibility that the refusal of one national registry to accept a proposed trademark application means a failure in all E.C. jurisdictions.

Directive on Trademarks (adopted in final form in December 1988). This important directive will establish harmonized national trademark rules. It includes a five year compulsory working proposal -- the trademark must be put to use within five years in the member state where registered, or be revoked on an E.C.-wide basis. Use in one member state validates the trademark for the whole of the E.C., which would be to the advantage of U.S. companies. All member governments are required to adopt conforming legislation within three years of final adoption by the Council of Ministers.

Community Patent Convention (signed 1975, but still not ratified by five E.C. member states, as indicated above). Once all E.C. members have signed, the CPC will protect patent rights in each E.C. country and the patent will have the same force in all E.C. member states.

Commission Green Paper on Copyright and the Challenge of Technology (issued June 7, 1988). This document outlines the copyright issues requiring immediate E.C. action, regarding application of copyright recognition to newer electronically-oriented technologies. The paper also provides a basis for the future E.C. role in the international development of intellectual property rights. As a result of the green paper, the EC Commission has proposed a directive that would extend copyright protection to computer programs. Such programs would generally be protected as other literary works under the Berne Copyright Convention. Other initiatives concerning electronic data bases and digital audio tape are likely to result from the green paper. The broadening of protection complements similar steps in the United States that have been supported by industry.

Directive on Semiconductor Topographies The E.C. has adopted a directive on the copyright protection of semiconductor designs, but only five countries (Germany, Denmark, France, U.K. and the Netherlands) have so far implemented this directive.

One further issue that should be noted here is the reciprocal treatment of E.C. intellectual property rights under Section 337 of U.S. trade law. Recent reports indicate that a GATT panel has upheld the E.C. claim. The E.C. argued that Section 337 discriminates unfairly against foreign companies that export to the United States by setting up a separate process under the International Trade Commission, rather than the federal courts, for claims relating to ownership of intellectual property rights. It was argued by the E.C., apparently successfully, that Section 337 procedures do not provide the importers with defenses comparable to those available in purely domestic cases. Since a final GATT decision has not been announced, it is not yet clear what impact this decision will have on U.S.-E.C. relations in the intellectual property rights area.

7. SOCIAL DIMENSION

The previous sections in Part II have all dealt with issues involving international trade questions and the reciprocal treatment of companies and products by the E.C. and the United States. The last three issues are different, in that they do not directly involve U.S.-E.C. economic relations, but general policy choices by the E.C. that may have a major effect on how U.S. companies do business in the European Community.

The question of the social dimension of the Internal Market has become one of the most critical subjects associated with EC-92. This is especially due to the goal of increased employment opportunity throughout the E.C., as discussed in the first part of this paper. And there have been important debates within the E.C. over the most appropriate and effective E.C. role in addressing the social dimension. This debate was stimulated by a speech that Commission President Delors made in 1988 to the annual meeting of the British Trade Unions Congress. He declared, "It is impossible to build Europe only on deregulation...The social dimension is a vital element."

What is meant by the "social dimension?" It has been defined by Delors himself in this way:

> -- First, measures adopted to complete the large market should not diminish the level of social protection already achieved in the member states.
>
> -- Second, the internal market should be designed to benefit each and every citizen of the Community. It is therefore necessary to improve workers' living and working conditions and to provide better protection for their health and safety at work.
>
> -- Third, the measures to be taken will concern the area of collective bargaining and legislation.

Some approaches to developing these points may be seen in a lengthy "Working Paper" on the Social Dimension, released in September by the Commission. It reflects a series of views within the Commission, primarily DG V (Employment, Social Affairs and Education). The paper basically combines two strands of action, both contained in Delors' more formally stated views.

First, there is a major concern expressed in the paper with improving labor mobility, training (especially in the poorer regions) and occupational health and safety protection. This agenda merges rather well with the Cockfield White Paper of 1985. The White Paper emphasized the physical mobility of persons and specifically proposed directives to harmonize health and safety standards for workers throughout the E.C.

European business, including U.S. companies operating in Europe, have been active supporters of the EC-92 program, and have tried to assist President Delors in increasing the momentum in public support for the program. This has included very positive support for the goals of EC-92 regarding increased worker mobility, improved working training and a generally more competitive labor market infrastructure throughout the E.C. For its part, the Commission has been extremely interested in examining innovative approaches from outside the E.C. itself, including the United States, Japan and the EFTA countries.

Secondly, the Working Paper also included proposals to establish E.C.-wide collective *bargaining and mandatory employee consultation and information rules, long-standing goals* of some European labor federations. It further suggested that EC-92 and consolidation of the internal market had led to concerns about "social dumping," the migration of industry to areas in the E.C. with low wage levels and, in the view of European labor federations, low standards of worker rights protection.

Four specific proposals or issues now before the Council of Ministers, all having a long history that predates the EC-92 proposal, are related to this second agenda:

1) Worker Consultation and Information. This was the subject of the controversial "Vredeling Directive" of 1980, which still formally lies before the Council. It is unlikely that the Vredeling proposal, with its requirement of extensive sharing by management of commercially-sensitive information with employee representatives in advance of corporate decisions, will be acted on in the near future. While the September 1988 working paper indicates that some type of general consultation and information proposal should be considered as part of the Social Dimension package, several draft documents relating to this issue have been withdrawn or sent back for redrafting, indicating lack of a consensus on this subject.

2) Workplace Health and Safety Directive. Since final Council action will probably be delayed indefinitely on a worker consultation and information directive because of its controversial nature, we can anticipate that there will be efforts to achieve some of these objectives partially through policy in other functional areas. One possible example is the proposed framework directive of March 1988 on health and safety in the workplace, which aims at achieving a uniformly high standard of worker protection at the workplace throughout the E.C.

The general goal of this directive is supported by E.C. industry, in keeping with general business support for E.C. safety standards on specific problems such as noise in the workplace or exposure to asbestos. For the most part, the draft directive focuses on employer and worker responsibilities regarding safety and health standards, actions and training in the workplace environment. However, Article 5 ("Employer Obligations") would require that all "planning and introduction of new technologies shall be undertaken in close cooperation with the workers and/or their representatives, particularly in respect of the choice of equipment and the working conditions, including those aspects connected with the working environment and the physical and psycho-social well-being of the individual." Such language could obviously be subject to expansive interpretation.

3) The European Company Statute. President Delors has revived the proposal to allow companies to choose to incorporate as "European" companies, rather than as companies organized in a specific member state. Potentially, this could allow a company to gain certain tax advantages, from being able to consolidate financial reporting at the European level. But Delors' initial proposal would require that a company choose some type of

formal system of worker participation in management decisions. Following the initial negative reaction by industry, the Council of Ministers directed the Commission to draft a new European Company Statute proposal in early 1989.

4) Fifth Company Law Directive. The company law directives are generally aimed at harmonizing corporate practices and structures throughout the E.C. The Fifth Directive concerns the organization of public limited companies and their management structure. The major controversy since the initial proposal of the directive in 1972 has been the proposed requirement for some type of employee participation in the company's overall board structure. Having been approved with amendments by the European Parliament, this directive is now again the subject of consultations between the Commission and the Council of Ministers.

Employers' Views

At present, NAM and other U.S. employers' organizations in the United States and Europe are developing a common position in response to the Social Dimension program. In general, these organizations have reacted favorably with respect to the first part of the Commission agenda, which focuses on improving the overall E.C. standard of worker education, training and mobility, and thus contributing to a reduction of the high rate of unemployment in Europe. In recent years, representatives of member companies have met in a series of seminars with Commission staff to explore U.S. and E.C. private and public sector cooperative approaches to these issues.

On the other hand, the reaction of business organizations in Europe has been negative to those proposals which seek to expand consultation and information requirements on an E.C.-wide basis. While no new formal position can be taken until further draft proposals are submitted, the view on existing proposals is that they are not necessary for the development of a more integrated internal market. Indeed, "harmonizing up" in terms of creating more rigid labor policies may reduce investment in those areas that need it the most. And there is widespread evidence, cited in the Commission's own studies, that more rigid labor relations rules that restrict the flexibility of management decisions will add to the unemployment problem in the E.C., not reduce it.

There is little possibility at present that these kinds of proposals could achieve the unanimous approval in the Council of Ministers which will be required under Article 100a for adopting policies affecting social affairs and employee rights. In particular, the U.K. government, with the strong support of British industry, is committed to oppose any new E.C. industrial relations policy which it believes will destroy the balance that it feels has been restored in British labor-management relations over the last decade. The concern remains in some quarters, however, that an effort will be made to achieve such policies through directives and other proposals ostensibly related to the other areas covered by the Internal Market program. This could lead to a confrontation within the E.C. over the interpretation of the SEA itself.

8. COMPETITION POLICY

The E.C. actively and directly regulates competition in Europe, under authority assigned to it by Articles 85-86 of the Treaty of Rome. This means that the E.C. may establish regulations which have the force of law within the member states. DG IV is the competition policy directorate. Since the 1985 Cockfield White Paper was developed in DG III, it did not include any specific competition policy proposals. However, there is no doubt that major changes in competition policy within Europe must accompany the development of EC-92.

This is because member state governments also retain rights of regulating competition. The coexistence of E.C. and member state regulation creates a patchwork of rules regulating mergers and takeovers within the E.C. and results in companies in different E.C. countries playing by quite different rules. The assumption is that member state governments, through their own competition and merger control policies, should not be able to frustrate cross-border mergers and acquisitions needed to create larger economies of scale and enhance E.C. international competitiveness. And because U.S. companies have typically expanded in Europe by acquiring existing E.C. firms or establishing joint venture arrangements with them, any major changes proposed in competition policy will have a major effect on the ability of U.S.-owned firms to cope with EC-92 market changes.

E.C. enforcement of competition policy has been restricted to company practices, and has not included direct control of mergers and acquisitions. Each country has its own policy in this latter area. The U.K. and Germany have the most aggressive national antitrust policies of the U.S. type, enforced through the Mergers and Monopolies Commission and the Bundeskartellamt, respectively. Other countries, such as France and Italy, do not have highly developed antitrust policies, but do control company actions and merger activities as a function of national industrial policies, tax laws, price controls and other policies. Among all the E.C. countries, only the U.K. allows hostile takeovers similar to the U.S. model. And some specifically discriminate against foreign acquisitions -- the Netherlands, for example, allows only 20 percent of the voting shares of any publicly-owned Dutch company to be held by foreign persons.

Proposals to establish direct E.C. control over mergers and acquisitions have been debated in Community institutions for fifteen years, with little forward progress. But the imminence of the enhanced internal market has spurred progress toward achievement of a new E.C. regulation in this area. The major proposal to emerge from DG IV, under the leadership of departing Commissioner Peter Sutherland, is the revised draft regulation to establish E.C. control over all mergers "having a Community dimension." It was proposed by the Commission in May 1988, after considering EP amendments to earlier drafts. Several revised versions have subsequently been circulated.

This draft regulation would establish E.C. control over all proposed "concentrations" (mergers and acquisitions) of companies with an E.C. dimension. An E.C. dimension is defined as --

- Worldwide turnover greater than 1 billion ECUs for the companies combined;

- Aggregate E.C.-wide turnover of 100 million ECUs, with no more than 75 percent of the total in any one E.C. member state.

In a recent twelve-month period, the Commission counted 171 transactions that would have exceeded the turnover thresholds of the regulation, though only a relatively small share of these also met the distribution requirement. For such major cases, the Commission's intent is that it should become the sole regulating body. The preamble to the draft regulation states that, "In order to provide for a uniform system of control of concentrations having a Community dimension throughout the common market, the Member States must refrain from taking any measure which might undermine the full effect of decisions pursuant to this Regulation." (Paragraph 27, quoted from draft of July 25, 1988.)

Because the Treaty of Rome limits E.C. authority to the competition policy area, however, the very next paragraph establishes a major qualification: "...This principle does not prevent Member States from taking measures with a view to protecting legitimate interests other than competition..."

This qualification may critically affect the attitude of both E.C. companies and U.S.-owned companies active in Europe. There is strong acceptance of the concept of a Brussels-based competition policy authority, which could expedite the approval of mergers and acquisitions creating larger economies of scale in the E.C. On the other hand, both U.S. and many E.C. companies are concerned about the "double jeopardy" aspect of establishing a Brussels-based merger authority, while continuing to maintain a veto authority in the national capitals over acquisitions.

There is also a further issue that affects U.S. interests and that also currently obstructs U.K. acceptance of the principle of an E.C. merger regulation. This is whether there should be a single E.C. policy on hostile takeovers. Britain, virtually alone in the E.C., currently allows hostile takeovers (witness the recent battle between estle and Suchard, two Swiss confectionery companies, for the British company Rowntree Mackintosh, a firm with widespread activities and brand recognition throughout the E.C.). The U.K. government can stop takeovers, but principally on competition policy grounds. In the British view, it would be unfair to disarm the U.K. government's major defense against large takeovers that it views unfavorably, while permitting the effective ban on hostile takeovers in other E.C. countries.

This British view could force the E.C. and its members into a harmonization of takeover rules. Certainly it is interesting that the new British Conservative Commissioner, Sir Leon Brittan, who has been politically very close to Prime Minister Thatcher, has been selected to replace Sutherland as the competition policy commissioner. U.S. business readers should also recall the point noted earlier in discussing the Commission statement on reciprocity of October 19, 1988 -- that in applying any common takeover policy to non-E.C. firms, the Commission will consider the reciprocal rights of E.C. firms in the acquiring company's home market.

9. MONETARY POLICY

The commitment of the E.C. to closer monetary policy coordination will have a major impact on the way U.S. companies do business in Europe. At the same time, there are major issues in this area that will influence international monetary policy and exchange rate developments, and therefore the conditions of U.S. international trade.

In 1988, there were two critical developments:

1) Full Liberalization of Capital Movements within the E.C. On June 24, 1988, E.C. finance and economics ministers, meeting in the Council of Ministers, gave final approval to a directive providing for complete liberalization of capital movements within the E.C. This means the elimination of all foreign exchange controls. In addition, all domestic monetary regulations that have a specific impact on capital transactions with nonresidents are subject to a notification procedure.

All E.C. member states must eliminate any remaining capital movements restrictions by July 1, 1990, except for Spain, Ireland, Greece and Portugal, who have a grace period through 1992. The Belgium-Luxembourg economic union must also eliminate its dual exchange rate by the end of 1992. The balance of payments safeguard provisions of the Treaty of Rome remain in effect, but the Commission will have supervisory authority over the implementation and maintenance of emergency exchange controls by members. U.S. companies operating in the E.C. can therefore look to essentially complete implementation of free capital movements within the E.C. between now and 1992.

2) Monetary Union. Agreement on the capital liberalization directive both cleared the way for and impelled the E.C. toward consideration of an economic and monetary union. The success of the European Monetary System (EMS) also encouraged a strategy of closer monetary policy cooperation. The Hanover E.C. summit of heads of government on June 27-28, 1988, therefore decided to establish a committee with the task of studying and proposing concrete stages leading toward such a union. The nature and topic of study was the result of a compromise. Most E.C. governments would have been willing to include explicitly on the agenda the exploration of the questions of an E.C. central bank and a single E.C. currency, but such far-reaching measures were opposed by the British government, which has yet to join the EMS.

The importance of this subject to President Delors, formerly French finance minister, is indicated by the fact that he is personally chairing the study committee, and also holds the new Commission's monetary affairs portfolio. The leaders of E.C. central banks were also requested to join the committee in their "personal" capacities. The committee is to report its findings "in good time" before the scheduled heads of government summit in Madrid, in June 1989. Current plans call for release of a report in the spring, midway between the installation of the new Commission and the Madrid summit.

The report of the Delors committee will almost certainly make policy recommendations that go beyond the type of consultation and coordination of policies now existing within the EMS or the broader G-7 group of industrial countries. It is assumed that there would be some mandatory policy coordination features. Leaving aside the question of the British relationship to closer coordination, another essential issue is whether there should be a "once for all" major reevaluation of the Deutsche mark before implementation of some type of mandatory coordination system. Rates in the present EMS range keep other E.C. currencies, notably the French franc, closely aligned with the DM, and therefore effectively overvalued with respect to industrial competitiveness in third country markets. But the effect of a close EMS relationship with a strong DM has also had the salutary effect of sharply reducing inflation rates throughout the E.C.

The outcome of these discussions and decisions will have a major impact on U.S. international industrial competitiveness. The movement of the DM within the EMS will affect both dollar-rate production costs within the E.C. and the competitive prices of German and other E.C. manufactured goods on world markets. Of equal significance to U.S. companies, in combination with the complete liberalization of capital movements planned by 1990-92, will be the impact on production location decisions within the E.C. itself.

10. OTHER POTENTIAL ISSUES

Export Controls

An issue not covered by the general European Commission reciprocity statement of October 1988, but related to U.S. and E.C. trade policies is the export control question. The general U.S. business assumption is that EC-92 will eventually have to include a common export control policy. Presently, enforcement of the controls agreed by the international Committee for the Control of the Export of Strategic Commodities (COCOM) is heavily reliant on national customs inspections. But these will be eliminated within the E.C. by 1992. Individual E.C. countries now maintain national control systems of varying effectiveness, which has led to U.S. concerns over diversions of national security-sensitive products and technologies.

It is not yet clear exactly how the U.S. government and the E.C. will resolve differences in export licensing practices under EC-92 and how such arrangements may affect U.S. companies. But this is an issue that should be monitored closely by American high-technology companies.

Defense Procurement

Procurement for non-military purposes in the E.C. is already covered by the existing procurement directives, which are to be enhanced as part of the EC-92 program. However, procurement of material for specifically military purposes is excluded from both the GATT code and existing E.C. directives. The October 1988 communication on the excluded sectors indicates that there are no further policy proposals at this time relating to military procurement, but states that the Commission should consider some initiatives in the near future, so that "their adoption and implementation are in concordance with the realisation of the Internal Market by December 31, 1992."

The Commission statement does not indicate that improved world competitiveness by E.C. producers should be a consideration in this policy. Rather, it relates the policy to security cooperation that would enhance development of a "European identity in external policy matters." This also conforms to the political cooperation provisions included in the Single European Act. It is not yet clear what effect proposals on intra-E.C. defense procurement will have on the U.S. defense industry or existing procurement arrangements within NATO.

APPENDIX I

MEMBERS OF THE COMMISSION AND THEIR RESPONSIBILITIES

(As of January 1, 1989)

Jacques Delors (France)	Secretariat-General (including internal services) Legal Service Monetary Affairs Forward Studies Unit
Frans Andriessen (Netherlands)	External Relations and Trade Policy Cooperation with Other European Countries
Henning Christophersen (Denmark)	Economic and Financial Affairs Coordination of Structural Funds Statistical Office
Manuel Marin (Spain)	Cooperation and Development Fisheries
Filippo Maria Pandolfi (Italy)	Science, Research & Development Telecommunications, Information Technology and Innovation Joint Research Center
Martin Bangemann (F. R. Germany)	Internal Market and Industrial Affairs Relations with the European Parliament
Leon Brittan (United Kingdom)	Competition Financial Institutions
Carlo Ripa di Meana (Italy)	Environment Nuclear Safety Civil Protection
Antonio Cardoso e Cunha (Portugal)	Personnel and Administration Energy and Euratom Supply Agency Small Businesses, Distributive Trade and Tourism
Abel Matutes (Spain)	Mediterranean Policy Relations with Latin America North-South Relations

Appendix I (Cont.)

Peter Schmidhuber (F.R. Germany)	Budget Financial Control
Christiane Scrivener (France)	Taxation and Customs Union
Bruce Millan (United Kingdom)	Regional Policies
Jean Dondelinger (Luxembourg)	Audiovisual and Cultural Affairs Information and Communication A "People's Europe"
Ray MacSharry (Ireland)	Agriculture Rural Development
Karel Van Miert (Belgium)	Transport Credit and Investment Protection and Promotion of Consumer Interests
Vasso Papandreou (Greece)	Employment and Industrial Relations Social Affairs Human Resources Education and Training

Information provided by EC Office of Press and Public Affairs (Washington, D.C.).

DIRECTORATES-GENERAL

DG I	External Relations
DG II	Economic and Financial Affairs
DG III	Internal Market and Industrial Affairs Task Force: Small and Medium-sized Enterprises
DG IV	Agriculture
DG V	Employment, Social Affairs and Education
DG VI	Agriculture

Appendix I (Cont.)

DG VII	Transport
DG VIII	Development
DG IX	Personnel and Administration
DG X	Information, Communication and Culture
DG XI	Environment, Consumer Protection and Nuclear Safety
DG XII	Science, Research and Development Joint Research Centre
DG XIII	Telecommunications, Information Industries and Innovation
DG XIV	Fisheries
DG XV	Financial Institutions and Company Law
DG XVI	Regional Policy
DG XVII	Energy
DG XVIII	Credit and Investments
DG XIX	Budgets
DG XX	Financial Control
DG XXI	Customs Union and Indirect Taxation
DG XXII	Coordination of Structural Instruments

APPENDIX II

QUALIFIED MAJORITY VOTING IN THE COUNCIL OF MINISTERS

As provided in Article 100a of the revised Treaty of Rome, voting on proposals related to the completion of the internal market in the Council of Ministers shall be by qualified majority. This applies in all cases except for proposals regarding:

-- "Fiscal provisions..."

-- Provisions "relating to the free movement of persons..."

-- Provisions "relating to the rights and interests of employed persons."

Such proposals must be passed unanimously by the Council.

Per Article 148 a "qualified majority" means at least 54 out of 76 votes -- the votes of member states being weighted according to the following formula:

France	10 votes
Germany	10
Italy	10
United Kingdom	10
Spain	8
Belgium	5
Greece	5
Netherlands	5
Portugal	5
Denmark	3
Ireland	3
Luxembourg	2

Appendix III

The New EC Approach to Harmonization of Standards and Certification

By Patrick W. Cooke and Donald R. Mackay
Office of Standards Code and Information
National Bureau of Standards

Most EC Member States have their own standards which set health, safety and quality requirements for goods sold in their national markets. When those national standards differ, or when product standards, testing and certification procedures are not recognized from country-to-country, technical barriers to trade can result. Producers who wish to market their products in more than one country are often forced to have their products tested and certified several different times. Products must often be modified to meet each country's standards. This is expensive and discourages the marketing of products internationally.

The European Community plans to have, by the end of 1992, harmonized EC-wide standards, and procedures for testing and certification that will allow all products that comply with EC standards to freely circulate within the European Community.

The EC's "New Approach" to Standards

To achieve EC-wide standards, as well as EC-recognized testing and certification procedures, the European Community has adopted a "New Approach" intended to overcome delays inherent in the process of revising thousands of highly technical and differing national standards.

Under the EC's "New Approach," EC Directives promulgated by the European Community are limited to defining "essential requirements" for protection of health, safety, the environment and, in some cases, industrial policy concerns. The task of establishing the technical standards for these essential EC requirements will be taken on by the non-governmental European standardization bodies, such as the Committee for European Standardization (CEN) and the Committee for European Electrotechnical Standardization (CENELEC).

Where national product standards already exist, these regional standards bodies will seek to harmonize them. In the absence of existing standards, the regional standards bodies intend to develop European standards based on international standards developed by such groups as the International Organization for Standardization (ISO) and the International Electrotechnical Commission (IEC). Alternatively, individual EC Member States may adopt appropriate standards to satisfy the established health, safety, and environmental requirements.

This process of producing several hundred new "harmonized" European Standards may take years. In the meantime, the European Community's program to achieve the free circulation of goods and services within the EC's internal market is not to be delayed. Once the harmonized, EC-wide "essential requirements" have been met, EC Member States will be obliged to recognize the adequacy of each others' national standards for non-essential characteristics. More importantly, for products where no EC-wide directive exists, Member States will also be obliged to recognize each others' national standards.

U.S. Standardization Concerns

The EC legislation dealing with standardization is likely to have a profound effect on U.S. exports, because harmonized standards may inadvertently be framed so as to hinder the market access of U.S. products. Equally important, products imported from the European Community may be more competitive due to the harmonized standards and the economies European companies will experience as a result.

Currently, U.S. exporters are not given the opportunity to review and comment on proposed EC standards during the initial development phase, i.e., before they are issued for voting within CEN and CENELEC. This prevents U.S. companies and standards organizations from reviewing EC proposals at a time when their comments are likely to be persuasive. Draft European standards issued by CEN and draft specifications issued by the Electronic Components Committee (CECC) of CENELEC "for formal voting" are available from the American National Standards Institute (1430 Broadway, New York, N.Y. 10018; tel. 212-642-4900).

Although the European Community claims that the GATT Standards Code does not oblige signatories to publish proposed EC standards when they are first notified to the EC Member States and their industry associations, the United States Government and industry have sought opportunities to review and comment on some early draft EC directives before they are "set in concrete."

EC Testing and Certification

Once EC-wide standards are agreed upon, two further technical steps may be required in order to market a product in Europe: 1) product testing to assure conformance to the EC-wide standard; and 2) assurance that the testing has been conducted correctly.

The European Community is now attempting to develop a sectoral approach to the mutual recognition of test data and certification procedures for products destined to circulate within the European Community. The intent is to avoid the wasteful duplication of effort in product approvals.

This initiative will involve the preparation of common conditions and codes of practice for implementation by national testing laboratories and certification bodies in the European Community. It will most probably lead to agreements for reciprocal recognition of national laboratory accreditation programs.

Recent statements by European Community officials indicate realization of an immediate need to establish a harmonized approach to testing and certification. Their sense is that without these additional initiatives, harmonized standards will not guarantee the free circulation of goods throughout the Community. The EC Commission proposes to meet this need by establishing an institution for certification and testing that will deal with both voluntary and mandatory declarations of conformity. This new EC institution would establish criteria leading to the mutual recognition of conformity marks, particularly among EC members and between the EC and EFTA* countries.

The EC Commission's informal proposal for this institution would make it completely independent of any existing regional or national standards body although all those standards bodies would be given a role in establishing EC priorities regarding testing and certification.

Conclusion

The European Community is proceeding aggressively with plans to harmonize differing national standards and testing and certification procedures into a single EC-wide body of uniform standards and regulations. This can offer real advantages to U.S. businesspeople interested in a large market for their goods. A U.S. product that meets the EC requirements in one Member State will then be free to be marketed throughout the European Community.

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* The Member States of the European Free Trade Association (EFTA) include Austria, Finland, Iceland, Norway, Sweden and Switzerland.

APPENDIX IV

SOURCES OF FURTHER INFORMATION

The following is a brief guide to further sources of information, including both published sources and offices where contacts may be made for more details on specific issues than is provided in this paper. It is intended to assist business persons who read this report, and is not a comprehensive bibliography.

European Community Official Sources

The major U.S. source of documents and information on EC-92 is the European Commission's office in Washington. The address is:

Delegation of the Commission of the European Communities
2100 M St. NW, Suite 707
Washington, DC 20037
(Tel. 202/862-9500)

The E.C. also maintains offices in New York and San Francisco.

Some basic E.C. documents that have been used in preparing this report are:

Completing the Internal Market: White Paper from the Commission to the European Council (Commission of the European Communities, June 1985).

Completing the Internal Market: The Progress Report Required by Article 8b of the Single European Act (Commission of the European Communities, November 3, 1988)

(DG III in Brussels also compiles periodic updates of all internal market directives that have been adopted. The most recent list is dated October 31, 1988.)

There are two Commission publications summarizing the economic background of the EC-92 program and the results of the full 35-volume E.C. study on the "costs of non-Europe." The briefer policy summary, designed for the business reader, is:

Paolo Cecchini, et al., The European Challenge -- 1992: The Benefits of a Single Market (published for the Commission of the European Communities, 1988; U.S. distributor -- Gower Publishing Co., Brookfield, VT), 125 pp.

A more comprehensive and formal summary of the findings is:

Michael Emerson, et al., The Economics of 1992, issued as European Economy, no. 35 (Commission of the European Communities, March 1988), 222 pp.

Appendix IV (Cont.)

On technical standards, the basic framework is outlined in:

Florence Nicolas, Common Standards for Enterprises (Commission of the European Communities, 1988), 79 pp.

The full Treaty of Rome, as amended by the Single European Act, is published in:

Treaties Establishing the European Communities, abridged ed. (Office of the Official Publications of the European Communities, 1987), 649 pp.

U.S. Government Official Sources

The International Trade Administration of the Department of Commerce maintains a comprehensive list of all proposed and adopted measures relating to EC-92. This information, with more detailed follow-up information on specific issues, can be obtained from:

Single Internal Market: 1992 Information Service
Office of European Community Affairs
U.S. Department of Commerce -- Room 3036
14th St. and Constitution Ave. NW
Washington, DC 20230
(Tel. 202/377-5276)

U.S. business visitors to Brussels should contact:

U.S. Mission to the European Communities
Blvd. du Regent 40
Brussels, Belgium
(Tel. from U.S. 322/513-3830)

See also the following U.S. government analyses:

Department of State, Bureau of European and Canadian Affairs, The European Community's Program To Complete a Single Market by 1992 (July 1988).

Glennon J. Harrison, The European Community's 1992 Plan: An Overview of the Proposed "Single Market", Congressional Research Service report no. 88-623 E (September 1988)

Office of the U.S. Trade Representative, Completion of the European Community Internal Market: An Initial Assessment of Certain Economic Policy Issues Raised by Aspects of the EC's Program (December 1988).

Appendix IV (Cont.)

Private Sector Sources

The best and most comprehensive study of EC-92, with specific references to effects of major proposals on U.S. economic interests is:

Michael Calingaert, The 1992 Challenge from Europe: Development of the European Community's Internal Market (Washington: National Planning Association, 1988), 148 pp.

The most comprehensive and current information on specific EC-92 developments is provided by the E.C. Committee of the American Chamber of Commerce in Belgium. AmCham publications are available for sale to non-members. A particularly useful and concise guide, that is periodically updated, is:

Business Guide to EC Initiatives, E.C. Committee of the American Chamber of Commerce in Belgium (latest ed. - Autumn 1988), 86 pp.

For copies of this guide and information on other AmCham material, contact:

American Chamber of Commerce in Belgium
E.C. Affairs Office
Ave. des Arts 50, Bte. 5
B-1040 Brussels, Belgium
(Tel. from U.S. 322/513-6892)

The **Chairman**. Let me take our next witness, Dr. Tyszkiewicz, from Syracuse University. Your statement will appear in the record. Please summarize your views.

[The biographical sketch of Dr. Tyszkiewicz follows:]

MARY T. TYSZKIEWICZ

Mary T. Tyszkiewicz is Senior Research Associate in the Technology and Information Policy Program in the Maxwell School at Syracuse University. She has received a Master of Science degree in Science, Technology and Industrialization from the University of Sussex and the Science Policy Research Unit (SPRU) in Brighton, England. Her SPRU thesis was entitled, "Emerging British Policy for Superconductivity: The National Committee for Superconductivity and the Interdisciplinary Research Centre for Superconductivity". Previous to her work in science and technology policy issues, Mary T. Tyszkiewicz was Research Assistant in the Materials Science Division of Ames Lab, which is a U.S. Department of Energy laboratory in Ames, Iowa. As an inorganic chemist for Ames Lab, she designed, performed and assessed various synthetic methods to make novel, air-sensitive, solid-state materials. She has also earned a Master of Science degree in Inorganic Chemistry from Iowa State University of Science and Technology in Ames, Iowa. A native of Chicago, Illinois, she obtained her Bachelor of Science degree in Chemistry from Marquette University in Milwaukee, Wisconsin.

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EDUCATION

Doctor of Philosophy in Public Administration, January 1989 - present. The Maxwell School, Syracuse University (SU) in Syracuse, New York. Specialization in Technology and Information Policy and Policy Analysis. Expected completion date, Summer 1991. (Advisor: Barry Bozeman)

Master of Science in Science, Technology and Industrialization, January 1989. University of Sussex, Science Policy Research Unit (SPRU) in Brighton, England.

Thesis Title: Emerging British Policy for Superconductivity: The National Committee for Superconductivity and the Interdisciplinary Research Centre for Superconductivity. (Advisor: Ben Martin)

Master of Science in Inorganic Chemistry, August 1987. Iowa State University of Science and Technology (ISU) in Ames, Iowa.

Thesis Title: A Low-Temperature Synthetic Route to a Novel Molybdenum Oxide. (Advisor: Robert McCarley)

Bachelor of Science in Chemistry, May 1983. Marquette University (MU) in Milwaukee, Wisconsin.

Semester Abroad, 1982. The Rome Center at Loyola University in Rome, Italy.

EMPLOYMENT

Research Associate - Technology and Information Policy Program, Syracuse University, January 1989 - present.

Investigating material science technology commercialization, transfer mechanisms and policies in the European Community (EC). This is a component of the third phase of the National Comparative R & D Project in the Technology and Information Policy Program at SU.

Research Consultant - Office of Science Policy and Research, Iowa State University, May - September 1988.

Studied emerging UK policy for superconductivity in the context of British material science policy. This is a section of the report from the Office of Science Policy and Research for the U. S. Department of Commerce entitled "Inventing Technological Futures: A Comparative Assessment of New Materials Research, Development and Transfer in the United States, the United Kingdom and Japan".

Research Assistant - Material Science Division of Ames Lab, US Department of Energy, Ames, Iowa; 1984-1987.

Designed, performed and assessed various synthetic methods to make novel, air-sensitive, solid-state materials.

Organizer and Teacher - ISU Chemistry Department, Summer 1985.

Implemented an introductory course for faculty, staff and students on methods to computer search the chemical literature. This initiated the use of the Chemical Abstracts Service online databases in the department. Since that time, over half of the department uses the system regularly.

Teacher Assistant - ISU Chemistry Department, 1983-1984.

Led small-group discussion sections for Freshman Chemistry courses; tutored individual students on basic chemical concepts; supervised and corrected introductory laboratory work.

PROFESSIONAL, ACADEMIC AND COMMUNITY ACTIVITIES

U.S. House of Representatives, Committee on Science, Space and Technology

- Invited Witness, May 17, 1989

- Testimony on "The European Community's Single European Act and the 1992 Plan: Their Effects on European Technological Collaboration and Material Science Research and Development."

Women's Honorary Society in Chemistry; Iota Sigma Pi

- Member; 1984-present

- Secretary for the Aurum Chapter; 1986-87

- Preliminary National Convention Committee Chair; 1986

American Association for the Advancement of Science

- Member; 1989

American Chemical Society

- Member; 1983-present

American Society for Public Administration

- Member; 1989

Foreign Study Night, Marquette University

- Organizer; 1982

Oxfam America Fast, Iowa State University

- Organizer; 11/83, 11/84, 11/85, 11/86

Committee on Lectures, Iowa State University

- Graduate Student Representative; 9/86-8/87

SPRU Teaching Committee, University of Sussex

- Master of Science Students' Representative; 11/87-8/88

ACADEMIC AWARDS

NSF/NATO Advanced Institute on Research Policy and Management, International Travel Grant, 1989

Syracuse University Graduate Scholarship, 1989

International P.E.O. Sisterhood Educational Fund, 1987-1988

Iowa State University Graduate College Scholarship, 1983-1987

Marquette University Presidential Scholarship, 1979-1983

Joseph Blasek Scholarship for Science and Mathematics, 1979-1983

STATEMENT OF DR. MARY TYSZKIEWICZ SENIOR RESEARCH ASSOCIATE, TECHNOLOGY & INFORMATION POLICY PROGRAM, THE MAXWELL SCHOOL, SYRACUSE UNIVERSITY, SYRACUSE, NEW YORK

Dr. TYSZKIEWICZ. I am a senior research associate in the Technology and Information Policy Program in the Maxwell School at Syracuse University.

I am pleased to be able to address the committee on EC 1992. Today, my goal is to describe some trends in the European Community's policies for research and technology in general, and material science in particular.

I would like to request, Mr. Chairman, that the longer version of my written testimony be included in the record.

The CHAIRMAN. It is in the record.

Dr. TYSZKIEWICZ. I would like to submit three supplemental papers to the committee, for their information. Two of those papers are by Margaret Sharp, from the Science Policy Research Unit in England. She writes on collaboration. The third is with Roberto Malaman, who works with the policy analysis group, IRS, of Italy. His paper is about the advanced materials market.

The CHAIRMAN. Without objection, so ordered.

Dr. TYSZKIEWICZ. The 1980s have seen a marked rise in the number of technological collaborative agreements between nations, among firms, and across sectors of government, university, and industry, especially in high-technology sectors. This type of strategic alliance is valued by nations and firms as an important mechanism for competing in the global marketplace.

I want to present the nature of research and development in materials in the general evolution of the EC's cooperative agreements, with the specific example of the Community's material science programs. On page 2 of my testimony, I am going to describe the nature of R&D material science.

Collaboration is very important. It has advantages to firms, and I can name three of them. One is that it allows them to enter new markets. Two is that it allows them access to technological knowhow. And three, it reduces the R&D costs certainly in the development of new products.

The market for materials science is a global one. And of course we have to exclude defense, or materials made for defense purposes. In general, it is open and differentiated, and it has many producers and users, many of them small and medium firms.

What I would like to describe are some mechanisms that stimulate innovation in materials science that are important to know. First of all, the optimum development of new materials depends on science and technology information flow upstream and downstream for materials suppliers. Therefore, final users are very important in creating new materials.

We see this in mission-oriented development programs, such as in military, space, nuclear, and alternative energy programs. Also, because information is important, the exchange between university, industry, and government labs has a large part to play. Since materials science research and development has a higher cost and uncertainty, since it is multidisciplinary, because it takes a long time to develop it, and also subsequently because these materials need to be tested and certified before they can be used in products, government policies play very important role in developing new materials.

And now, I would like to move on to page 3, and the second section of my testimony, and I will talk about the evolution of the European Community's Strategic cooperative R&D programs. It is important to know that they evolved because of the competitive global markets and the convergent expectations of the European Community.

We have to think about the early 1980s and what was going on in Europe at that time. Cooperation in R&D was considered a partial solution to the perception of the European over-dependency on foreign—which was mostly American and Japanese—technology, and then its related, indigenous deficiency of European research capacity. Then of course, the third factor would be just the growing cost and resource needs of high-technology research in general.

Also at the same time, there was emerging a collective notion of the European firm in Europe. Firms were not just thinking of themselves as Belgian firms, they were thinking as Europeans.

Also, within the European Community they desired to get firms more involved in making policy and also having a more strategic industrial policy. So out of that comes the ESPRIT program, which you have heard a lot about.

What I want to emphasize about the ESPRIT program is just its general organization. First of all, conditions for participation in ESPRIT are straightforward. Open invitations for proposals are announced through the official journal of the European Community and the various member states. Two industrial partners from different countries are required. However, university and government lab partners are encouraged also. Research costs are shared, half is borne by the industrial partners, and half by the European Community.

Because this is a pre-competitive program, since the European Community decided to set it up that way to preclude antitrust and competitive problems, the results of the research is shared with all of the members in each particular program. However, the creators of the research are allowed to commercialize their research first, and they have first priority in commercializing that research.

Now, I would like to move into section three of my paper, which is on page 6. I am going to talk specifically about programs in the European Community that deal with materials science. Those are BRITE and EURAM. First of all, I will talk about BRITE, which means "basic research for industrial technologies in Europe." It was launched in 1985, and its purpose was to boost the competitiveness of the manufacturing industries, especially in traditional sectors such as automobiles, chemicals, and textiles, through encouraging new production technologies.

It had a budget of U.S.$200 million for a four-year period, from 1985 to 1988. Of this budget, 19 percent was devoted to new materials. European interest in the program was incredibly high. They received five times the amount of requests above the allocated budget. So therefore, its selection procedure was very stringent. Four out of five proposals were rejected, and some of the rejected proposals obviously were merited, but there was no money available.

In July of 1988, 174 projects in the BRITE program were evaluated by the EC. There have been some conclusions to that. One is that there has been an overall success, despite the limited budget of BRITE. Research activity in member states was definitely increased through the program. Eighty-five percent of project managers stated that the project work would not have been undertaken without EC financing. All member states have participated. However, it is important to point out that 44 percent of it went to large firms and large contractors.

The EURAM program was specifically set up for advanced materials in 1986. It was a three-year program, very much smaller. It was with U.S.$33.5 million. It had three research areas: metals, ceramics, and composites. Of the 302 collaborative partners, 37 percent were from large industry, 34 percent from universities, and 7 percent from small and medium enterprises.

Now, what makes these programs really interesting is what the European Community decided to do in March of 1989. They decided to combine BRITE and EURAM, to promote synergies between production technologies and the development of advanced materials, especially for industrial use.

The research areas that will be investigated in this program are advanced materials, advanced testing techniques, powder metallurgy, manufacturing technologies, and aeronautics. It is conceived as a four-year program, which starts this year and will go to 1992. It will be organized like the previous program, except that it will have over two-and-a-half times the budget of both the previous programs combined, which gives us a total of U.S.$560 million. And we will still have the 50 percent financing and the requirement of two industrial partners from other countries.

A new wrinkle in the BRITE-EURAM is in its incentive that the EC has started to encourage small and medium firms to join the programs. They are called feasibility awards. Through these feasibility awards, the EC will fund up to 75 percent of the cost of research for small European research organizations.

And now, I would like to move on to page 10 of my testimony, section four. What I am going to try to do is to project some of the trends of the 1980s in European cooperative research, and talk about what might happen in the 1990s.

First of all, my first point is that the EC is a developed model for strategic R&D and industrial research. It is a flexible model. It has been adapted for about a dozen EC programs. Each has been set up according to the particular characteristics of the sector and the market.

Although it is premature to assess the programs fully at this time, most definitely one benefit has been just the process of collaboration to the research partners. Everyone has emphasized how small a percentage the EC budget is. I think we all know that it is about 2 percent of the total European budget.

But through the cost-sharing, and also through catalyzing partnerships in Europe, this small bit of budget has a much greater effect than the numbers would lead you to believe. So what I think for the 1990s is that EC strategic programs will proliferate. They are successful, they are easy to run. Industry is interested.

Also, since the programs in the 1980s have focused on pre-competitive research, we are going to begin to see some of these marketable products in the 1990s. It takes about ten years for some of these to come out.

I would like to move on to the second trend, and I think we will see it is on page 12 of my testimony. One of the more interesting observations is that one of the strongest countries in materials science in Europe is West Germany, and it does not participate very much in EURAM, which is the advanced materials EC project.

West Germany accounts for only 13 percent of the collaborating partners, while France accounts for 27 percent, and the UK accounts for 24 percent. So we can speculate, why is West Germany's participation low?

One reason is that German firms are very strong, they have good in-house R&D, they do not have to collaborate. The other thing is that national German government programs and R&D support for materials research is also very good. The third thing is that the West German government, or the West German materials market is a strong one. So when these firms would like to collaborate, they do not have to go outside their boundaries; they can find collaborative partners inside.

So again, this reinforces the view that EC programs have a much greater impact to firms in weak materials markets and also countries with fewer research resources, which is exactly one of the things that the EC would like to catalyze.

I will move on to my fourth point, which is on page 15, and this is another thing that is a continuing theme throughout the testimony in the past two days, the development of competition policy. This is a great concern of what the effect the integration of the European market will be, and how it will affect industry, both European and foreign.

Most observers agree that the market will become more dynamic and more competitive, and may lead to larger European companies. So the question is, how will these bigger companies be regulated in the larger competitive market? Issues in competition policy and antitrust policies are beginning to be discussed in the Community and European industries, especially with respect to the small and medium firms in Europe. They are worried about this.

What I would like to point out is, if stricter competition policies are set up in the EC, this will definitely affect the type of programs that I have been talking about. Because right now, the strategic R&D programs focus on pre-competitive research. Intuitively, pre-competitive research is supposed to mean industrial basic research. But in practice, if you look at the EC programs, some of these are basic industrial research, but some others actually are near market product development. So if there is a stricter definition of competition, it will limit the scope of some of the programs as they have developed.

I would like to move on to what I see are the effects for U.S. science and its competitiveness, which is on page 16. What I see is that, if you assume that European firms are only going to collaborate to a limited degree, they cannot collaborate with everybody, and since the EC programs have been popular, one has to believe that the Europeans will not collaborate as much with Americans and/or the Japanese.

A follow-on for this, which is not really clear right now, is that it is possible that also joint ventures could decrease. Because oftentimes, from collaborative research, joint ventures follow. I think this is probably obvious, but the U.S. does not have a comparable industrial R&D program like the EC schemes.

The EC has stimulated industrial R&D through cooperation. I think the committee will agree that cooperation between American firms, government, and university labs, has increased. We just do not have a comparable program, a strategy, for industrial R&D like the European one.

I think what I will move on to is my last point, which I thought was a lesson that we could take away from the European experience. That is on page 18. I find that the EC's strategic cooperative R&D programs can be a model for similar programs of cooperative R&D in the United States.

There are three characteristics that I think make this attractive. One is that it is simple in design, organization, and implementation. The second is that, through strong industrial input, this encourages firms to participate. The third point is that the EC programs have heightened awareness of potential European collaborative partners in Europe.

I think the EC model could be adapted especially to help American small and medium firms through collaboration, between them and government and university labs. Also, I think that we see in the EC experience that small and medium firms often need more government assistance to make these types of collaborative projects desirable and feasible for them, especially in a market like materials science where there is a diverse number of producers and users often in small and medium firms.

It could be a good strategy, a good program, to have some type of clearinghouse for potential partners in materials research.

So what I would like to say in summary is that the EC strategic collaborative R&D programs have helped European integration through changing the narrow national focus of the European member states and firms to the opportunities and the challenges of the global market. I think, as in the hearings over the past few days, the U.S. must continue to monitor these changes in order to assess the implications of these developments on American science, technology and competitiveness.

Thanks a lot, Mr. Chairman.

[The prepared statement and additional submittals of Dr. Tyszkiewicz follow:]

Testimony of

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on

Strategic Cooperative R&D Programs in the European Community (EC): Their Evolution and Implications for European Materials Science Research and U.S. Science, Technology and Competitiveness

Before the

U.S. House of Representatives

Committee on Science, Space and Technology

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Mr. Chairman, my name is Mary Tyszkiewicz and I am Senior Research Associate in the Technology and Information Policy Program in the Maxwell School at Syracuse University. Today, my goal is to describe some trends in the European Community's policies for research and technology in general and materials science in particular.

As the Committee has observed, the 1980s has been marked by the rise in the number of technological collaborative agreements in research between nations, among firms and across the sectors of government, university and industry research enterprises. Especially in high-technology sectors, this type of strategic alliance is valued by nations and firms as an important mechanism for competing in the global marketplace. In this context, I will present the nature of R&D in materials and the general evolution of the European Community's cooperative R&D agreements with the specific example of the Community's materials science programs.

I. The Nature of Research and Development in Materials Science: Multidisciplinary Research and Collaborative Patterns in a Global Market

Characteristics of the materials science market and its research and development process encourage collaboration. Cooperation in R&D can be used in firm strategy to enter new markets, to gain access to technological know-how and to reduce R&D costs and uncertainty in developing new products. All of these factors come into play in the new materials market.

In general, the market for advanced materials is a global one. Excluding materials developed exclusively for military use, the new materials market is relatively open and differentiated, with numerous and diverse producers and users. Optimum development of new materials depends on scientific and technological information both up and downstream from materials suppliers. Stimulation for innovations in materials often originates through potential final users, especially in mission-oriented materials development programs such as in military, space, nuclear, alternative energy and information technology sectors. Basic and applied science interact in a complex way in the development of new materials. Production engineering inspires the creation of new materials, while basic science is integral to understanding mature materials technologies. This type of multidisciplinary research is promoted through stable relationships between universities, public laboratories and firms. Materials science R&D programs have higher costs and uncertainties related to them because of their multidisciplinary nature, long development periods, specialized equipment and testing and certification requirements. Therefore, government policies can play a large role in the development of advanced materials by reducing uncertainty and risk involved in commercializing new materials.

Competition in the materials science market exists not only among firms but also between alternative materials. The slump in demand for traditional materials like aluminum, steel and glass has induced firms in these markets to include more advanced materials in their product mix. Therefore, many companies in the materials science sector have enlarged their product portfolios through diversification strategies of new in-house research directions, acquisition of existing companies or joint ventures in materials research. In the competitive environment of the materials science market, cooperative research is an important industrial strategy.

Throughout the 1980s, international cooperation has become a rapidly increasing feature of materials research. International strategic alliances have emerged to help ameliorate the stress of competition through sharing costs and exploiting research synergies. In the European materials science market, these type of cross-national agreements are more likely seen in market sectors with strong technical and commercial ties such as the European aerospace and semiconductor market.

II. The Evolution of the European Community's Strategic Cooperative R&D Programs: Competitive Pressures and European Consciousness

The European Community has developed a successful mechanism for long-term collaborative R&D across nations and between governmental, academic and industrial research units in high-technology sectors. These programs evolved out of competitive pressures in global markets and convergent expectations of the Community, its member states and European business.

In the early 1980s, the cooperation in European research was seen as a partial solution to the European perception of an overdependency on foreign (mostly American and Japanese) technology, a related indigenous deficiency of European research capacity and the growing cost and resource needs in high-technology research. Concurrent with the recognition of tough competition in the global marketplace, there emerged a collective consciousness in the European industrial community of the value and the particular needs of "European enterprises" which spanned the individual countries.

At the same time, there was a desire in the European Community to move towards a more strategic approach to industrial and R&D policy development, with significant input from European industry. Immediate concern with gaps in the European information technology base led to the development of the European Community's flagship program in cooperative R&D named European Strategic Program for Research and Development in Information Technology, or ESPRIT. Subsequently, this program has become the model for the EC's cooperative programs in high-technology sectors like biotechnology, materials science and telecommunications.

The ESPRIT program was conceived jointly by the Commission of the European Community and European industrial leaders in information technology. Collaboration was identified as one of several means of improving technological competitiveness. This would improve information flows between European industries and European R&D capabilities in governmental, academic and industrial research enterprises. It was hoped that this prospective program would promote joint ventures within Europe which otherwise would not have been considered. It was decided to only support pre-competitive research, in order to avoid legal barriers and battles in EC-funded shared-cost cooperative R&D.

Proposed in 1982, the ESPRIT program was conceived as a ten-year project, beginning in 1984 and running to 1993. ESPRIT focused on generic information technologies (microelectronics, software technologies) and their applications (office systems, CAD/CAM). Phase I of ESPRIT (1984-1989) funded 201 projects selected by a panel of sixty experts. The projects involved 210 research institutions and 240 firms, a majority of which were large companies. Seventy-five percent of the collaboration is between firms and academic research units. Phase II of ESPRIT (1989-1993) has just begun with three times the budget of the first phase.

The conditions for participation in the ESPRIT program are straightforward. Open invitations are announced through the Official Journal of the European Communities, member state governments and various publications. A proposed project must have two independent industrial partners from separate member states; government and academic lab partners are encouraged. The cost of the research is shared. One-half of the project cost is supported by the industrial partners; the other half is furnished by the European Community. Since this is pre-competitive research, the results of the collaborative scheme are shared by all participants in the ESPRIT program, although the creators of the research have priority in commercializing their ESPRIT research.

III. The European Community's Strategic Cooperative R&D Programs for Materials Science: BRITE and EURAM

The European Community has taken small yet significant initiatives to catalyze cooperation in industrial R&D in general and advanced materials in particular. As in the ESPRIT program, BRITE (Basic Research for Industrial Technologies in Europe, launched in 1985) and EURAM (EUropean Research on Advanced Materials, initiated in 1986) programs catalyze cooperative relationships across nations and between research units in industry, universities and governments.

The BRITE program was created to boost the competitiveness of Europe's traditional manufacturing industries (cars, chemicals, textiles, aircraft, shipbuilding, etc.) through application of new production technologies. BRITE promoted collaboration in basic technological research, with a partial emphasis on materials research. With a budget of 175 million ECU (US$ 200 million), BRITE encouraged cooperative research in nine sectors, which were selected in agreement with European manufacturers. From 1985-88 the following technical areas were investigated in BRITE: reliability, wear and deterioration of industrial materials, laser technology, joining techniques, new testing methods, computer-assisted design and manufacturing (CAD/CAM) and mathematical modeling, new materials, catalysis and particle technology and new production methods for flexible materials (textiles). New materials research accounted for 19% of the total BRITE budget.

There was strong interest by European manufacturers in the BRITE program. The program received proposals with requests for R&D funding over five times its budget. Therefore, the selection process was stringent, with four out five proposals being rejected for funding. Through the competitive selection process, some merited projects could not be funded because of the limited budget. With European industrial interest high in this cooperative scheme, some observers have speculated that a less than 50% subsidy could still encourage collaboration in these industrial R&D research areas.

The BRITE program and its 174 projects have been considered a success by the European Community by encouraging research in basic technologies for industry. With its limited budget, BRITE enhanced research activity in the member states. Over 85% of the participating project managers stated that their project work would not have been undertaken in the absence of BRITE monies. Even the technological less-developed member states had strong industrial involvement, like Ireland and Greece. However, most BRITE projects went to large companies and large contractors, with forty-four percent of the budget allocated to enterprises with more than 5,000 employees. Although all member states participated in the scheme, France, the United Kingdom and Germany secured two-thirds of the budget. However, relative to national GDP and to national investment in research, the smaller and less developed member states received a higher share of the budget than the larger member states.

In 1986 the European Community announced a small program, EURAM which was completely devoted to advanced materials. It was organized as a three-year scheme (1986-89) with a budget of 30 million ECU (US$ 33.6 million). Research was focused in three areas : metals (aluminum, titanium and magnesium alloys, magnetic materials, electrical contact materials coating and tooling materials and thin-walled castings), ceramics (engineering ceramics, metal ceramic interface, ceramic matrix composites and high-temperature ceramics) and composites (with organic, metallic or other matrices). In EURAM's 84 projects, the research efforts were distributed according to the following areas: metals (45%), composites (30%) and ceramics (25%). Of the 302 collaborating partners, 37% were from large industries, 34% were from universities, 7% were small and medium enterprises, with the rest of the participants in other categories.

In March 1989, BRITE and EURAM were combined to further promote the synergies between production technologies and the development of advanced materials and aeronautics. These were merged to strengthen the competitive position in the medium-term (5-10 years) of the EC's industries in world markets. The emphasis in advanced materials in the BRITE/EURAM scheme is to develop new materials and processes for industrial use. The expanded joint program includes technologies for advanced materials (high-temperature ceramics, superconductors, special glass, light alloys and composites), advanced testing techniques for feasibility and quality control, membrane science and technology, powder metallurgy and surface treatment, advanced design and manufacturing techniques and aeronautics (acoustics, aerodynamics, advanced embarking and propulsion systems).

The four-year BRITE/EURAM program (1989-92) is organized to model the previous programs. With a budget of 499.5 million ECU (US$ 559.4 million), the Community will fund fifty-percent of joint projects between businesses, universities and research centers of the member states. The projects must involve at least two industrial partners from two different countries. As a pilot scheme to increase and encourage the participation of small and medium firms in these projects, the Community has introduced program of Feasibility Awards. These awards confer up to 75 percent funding to smaller European research enterprises.

In European cooperative R&D in materials research, it is important to note the EUREKA program for advanced materials, named EUROMAT. The EUREKA (the European Research Coordination Agency) scheme, inaugurated in 1985 is outside of the European Community, yet its mission has developed to be complementary and coordinated with the EC. The basic distinction between EUREKA and EC research is that EUREKA explicitly emphasizes industrially-led, near-market research without reference to a strategic program, while EC programs encourage higher-risk, longer-term and peer-reviewed projects in a strategic framework. The EUROMAT program has funded 19 projects with a budget of 250 million ECU (US$ 280 million).

These European Community strategic research schemes create incentives for firms to engage in cooperative research through providing financial assistance and focusing on pre-competitive technology. The Community's intent in their strategic cooperative R&D programs was to halt the decline in intra-European investment and to help bring European technology up to the world's "best-practice" standard. However, although the goals and basic organization of EURAM, BRITE and ESPRIT are the same, these programs have been implemented with different strategies. ESPRIT is unique since the program was jointly designed and promoted with the leading European companies in information technology and the Commission of the European Community. In contrast, industrial R&D and the development of advanced materials are more diffuse research areas, which span beyond particular sectors. Therefore, European Industry has not had a central role in the definition of the objectives of BRITE and EURAM, unlike

ESPRIT. In addition, the role of the BRITE and EURAM program in coordinating European research in industrial R&D and advanced materials is limited because of the size of their budgets. ESPRIT coordinates European information technology research through sheer size of its program: Phase II has a budget of approximately 1.6 billion ECU (US$ 1.8 billion), which is four times the newly proposed BRITE/EURAM budget (499.5 million ECU, US$ 559.4 million).

IV. The Implications of the European Community's Strategic Cooperative R&D Programs: Projecting the Trends of the 1980s into the 1990s

In this section I will highlight the important emerging trends which have developed in the 1980s in the European Community's industrial R&D policies, with respect to the EC's evolving cost-sharing strategic research programs.

A. The Development of a Model for Strategic Cooperative R&D Programs

The European Community now supports over twenty cooperative R&D programs, each a variant of the seminal ESPRIT scheme. It is clear that the ESPRIT model has been a successful mechanism for the European Community to encourage research in strategic sectors. The basic framework of the ESPRIT program, which is promotion of collaborative pre-competitive research across nations and between institutions through cost-sharing has been adapted and managed according to needs of each program sector and the nature of the research. While the ESPRIT program is heavily directed by the European market leaders in information technologies (a "top-down" approach), schemes like BRITE and EURAM are more diffuse, leading to a "bottom-up" research direction. As provided for in the Single European Act, each research scheme defines the detailed rules for implementing it, fixes its duration and provides for the necessary finances.

The ESPRIT program was instituted as a response to international competition in the marketplace, especially with respect to the U.S. and Japan. An underlying goal to all of the EC's strategic research programs is to improve the competitiveness of European industries.

These programs are planned as long-term projects. Most of the EC strategic R&D programs are usually four years long. The length of the research program is added incentive for firms to join since the longer time period encourages the collaborative process and the selection of higher risk projects.

At this early stage of the EC's programs, it is premature to fully assess the impact of the EC's strategic research schemes. Although some technical successes have been achieved, few commercial products have been produced through the programs. Yet, it seems some significant benefits of cooperative R&D go beyond the technological products produced. Rather, they originate from the process of research collaboration between the participation of firms, universities and research institutes.

Although the EC's strategic cooperative R&D programs have become useful mechanism to help European firms to compete in the global marketplace, they will not replace industrial joint-ventures in R&D. Other European cooperative programs, like EUREKA which emphasize "near-market" research will also be important.

As compared to the national budgets for European R&D, the European Community's expenditure on science and technology is quite small. In general, the EC's research budget is less than five percent of the total research expenditure in Europe. Yet this small amount has an impact beyond its limited fiscal resources. Through the EC's cost-sharing programs, the impact of their research funding effectively doubles.

The European Community has had a catalytic role in accelerating European collaboration in research through sponsorship of cooperative R&D projects. The process of cooperation has created small but positive benefits for European science and technology. The Community has assumed the role of facilitator and has provided a forum for member states to agree on research goals and strategies to develop European technologies. It has helped to modify the insular focus of the member countries and firms to seek out trans-Europe synergies in research and technology.

Since these projects have been relatively successful from both a Community and industrial point of view these agreements will proliferate in the 1990s. In addition, because the 1980s collaborative programs focused on longer-term pre-competitive research, some commercial products from these schemes will most likely arrive on the market during the 1990s.

B. The Trends in European Materials Science and Cooperative R&D

One of the strongest countries in materials research, West Germany is not actively represented in the EURAM projects. Of the three largest countries participating in EURAM, West Germany accounts for only 13% of the collaborating partners, while France and the United Kingdom represent 27% and 24%, respectively. The larger German materials firms may be less likely to join into European cooperation since they have superior in-house R&D capabilities and strong national R&D support and programs. Also, since the German market is a dynamic one, these firms can find cooperative partners within their own borders. Collaboration between German firms in materials research tends to be between producers and users in the automotive, chemical and aerospace sectors.

This observation reinforces the view that the European Community's programs have a greater impact to firms operating in weak national materials markets and countries which are less endowed with research resources, such as in the southern European countries. Some European materials markets can have strong supply firms and weak user companies, while others have dynamic materials purchasing corporations and weak producers. These type of markets can retard the development of new materials, since important innovations in the materials sector often emanates from collaboration between materials suppliers and users. Because the EC projects encourages firms to find other European partners for research, cooperative projects can ameliorate the deficiencies in the national markets. The collaborative project sponsored in the EUREKA EUROMAT program between Fiat, the Italian auto manufacturer and Pechiney, a French materials producer is an example cross-national collaboration in the materials sector. This project will develop a ceramic engine. The Italian market does not have strong suppliers of ceramic materials, so European collaboration was an ideal way to pursue this research.

In the 1990s, collaborative R&D between European research enterprises, both in pre-competitive (BRITE/EURAM) and near-market (EUREKA EUROMAT) programs will become an important mechanism for promoting the development of new materials in Europe.

C. The Effects of the 1992 Single European Market

The Single European Act (SEA) and the 1992 Plan does not herald a revolution in European Community's science and technology policy, but rather it is an indication of the convergent expectations of the Community, its member states and European industry. The combination of the SEA and the 1992 Plan accelerates changes and trends which have been emerging steadily since the early 1980s.

The Single European Act specifically formalized R&D policy and its goal of strengthening industrial and economic development. Implemented in 1987, the SEA amended the European Economic Community's Treaty to formally include research and technological development as an official Community goal. This section (Title VI in Part III of the European Economic Community (EEC) Treaty) emphasizes in its first article that the aim of the Community in research and technological development policy is to strengthen the scientific and technological basis of European industry and encourage it to become competitive on an international level.

It is important to note the emphasis of the European Community's research and technology policy is implemented to improve the competitive position of European industry. Also, European collaboration in the 1980s has been stimulated as a reaction to international competition in the marketplace, especially with respect to the U.S. and Japan.

The 1992 Plan does not specifically discuss science and technology. Yet, it is considered an integral condition for the integration of the European market. The Plan emphasizes the harmonization of technical standards (especially important in the adoption of new materials) and liberalization of public procurement markets (important for high-technology industries.)

In the 1990s, integration in European science and technology will continue. Yet, national R&D policy and programs will continue to have the major role in the member states' research and technology strategies.

D. The Development of Competition Policy in the European Community

The major concern regarding the integration of the European market is how the Single Market will affect European industries. The restructuring already occurring in the European market has increased the process of concentration in European industries. This may lead to bigger companies in a more competitive European market.

The European Community's competition policy derives from Articles 85-94 in the Treaty of Rome (the EEC Treaty). Although the Community has been increasingly active in this area, the EC's anti-trust policies are still only half-formed. It is still unclear how the Community's policies will evolve as the EC moves into the 1990s. Fears that the liberalized European market may catalyze industrial concentration in Europe may lead to the development of stronger competition policies and tough anti-trust laws. Small and medium sized firms are especially worried about their welfare in the integrated 1992 market.

Strict competition policies would effect the Community's strategic cooperative

R&D projects in pre-competitive research. Ideally, pre-competitive research means that this type of cooperation between firms should not affect or modify the competitive position of European companies. The term is supposed to connote basic industrial research, yet in practice pre-competitive research ranges from strategic basic research in some programs to near-market product development in others. Small and medium size enterprises and European industry generally believe that a reassessment and clarification of the pre-competitive research and its competitive market effect is necessary. This may lead to a stricter definition of pre-competitive research, which is now used very loosely in the Community's strategic cooperative R&D projects. The 1990s will see debate over and the development of the European Community's competition policies.

V. The Effect of the Trends in the European Community's Science and Technology System on U.S. Science, Technology and Competitiveness

A. The EC's Strategic Cooperative R&D Programs

The European Community has been successful in promoting intra-European collaboration in research and development. Assuming that each European company will be involved in a limited number of agreements, cooperative R&D with American partners must decrease. Since often cooperative R&D leads to joint-venture agreements, European and American joint development projects may also decrease.

The United States does not have a research program to promote strategic industrial R&D as in the European Community's schemes. Although the ultimate benefits of these programs are yet to be seen, the certain advantages to European firms participating in these schemes have already manifested themselves. One such advantage is that many firms became involved in longer-term research which they could not have otherwise pursued for financial reasons. Although research agreements between American industry, universities and government labs have increased in the 1980s, strategic industrial research in the U.S. is not facilitated as it is in the EC.

B. The 1992 Single European Market

The European Community will continue to have a role in articulating directions in strategies for European R&D. It will also serve as a forum for Europeans to articulate their concerns in these areas. The European Community's research and technologies policies will not take over the role of the member states national R&D policies, but rather will complement and enhance them.

The development of competition policies should be monitored in order to assess the effects on American firms located in Europe and at home. Also, the U.S. should watch out for the implications on cooperative R&D from the evolving European competition policy

As stated in the Single European Act (SEA), "The Community may make provision for cooperation in Community research, technological development and demonstration, with third countries or international organizations." Therefore, countries outside of the community are not prevented from participating in these research programs. As of now, this provision has been implemented with respect to the six European Free Trade Association (EFTA) countries: Austria, Sweden, Switzerland, Norway, Finland and Iceland. However, since the stated aim of the

Community's research and technology policies are to enhance the competitive position of European industry, it seems apparent that as the major competitors, U.S. and Japanese firms would be discouraged although not necessarily precluded from participating in the EC's programs.

V. Some Lessons from Europe for Encouraging Industrial R&D for Competing in the Global Marketplace

The European Community's strategic cooperative R&D programs are useful and simple mechanisms which encourage collaboration in industrial R&D. The U.S. may consider this model as another strategy to improve competitiveness of American industry, especially in small and medium companies. There are three salient characteristics which make the EC's programs successful. First, they are simple in design, organization and implementation. Second, through strong industrial input into the programs they encourage business participation in these projects. Third, the EC programs have heightened industrial awareness of potential European collaborative partners.

This mechanism of cooperative research could be adapted to fit the needs of U.S. industry. An EC-like program could be developed to especially encourage collaboration between small and medium enterprises with academic and governmental research units. As observed in the European experience, small and medium sized firms require more governmental financial support to make desirable collaborative project feasible for them.

Small and medium firms are especially important in the differentiated market for materials, with its many and diverse producers and users. The establishment of a national clearinghouse for potential partners in the development of new materials could help small and medium materials suppliers and users stay competitive in the global materials market. A program such as this would help small and medium firms to identify potential collaborative allies.

The most important effect of the EC's strategic cooperative R&D programs is that it has helped Europe to change the narrow focus of member states and businesses from national markets and boundaries to the opportunities and challenges of the global market. The U.S. Government and American industry is well aware of the intense competition in the global market. As in the hearings the Committee has organized over the past two days, the United States must continue to monitor changes in the international marketplace, in order to assess the implications for American science, technology and competitiveness.

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EUROPEAN TECHNOLOGY: DOES 1992 MATTER?

by

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LEMSAA

1. Introduction

"Europe's Technological Erosion Leaves Huge Competitive Gap", Wall Street Journal, 31 January 1984. "European Technological Capabilities have Shown a Spectacular Improvement", Le Monde, 3 November 1988.

I begin my lecture with these two quotations to illustrate both how quickly time passes and how rapidly perceptions can change. In January 1984 I was putting the finishing touches to the manuscript of Europe and the New Technologies. It was the depths of the period of Europessimism: the Germans were convinced that their industry and their workers had become fat and flabby, and, as the Wall Street Journal bluntly reported, it was the leaders of European industry who were themselves writing off their chances of catching up in the world of high technology.

I was at pains, in Europe and the New Technologies, to emphasise that it was not all doom and gloom. The story of the West German machine tool industry which had faced up head-on to the Japanese challenge in computerised machining centres; the strong presence of the French, Dutch and Norwegians in the offshore supplies industry; the continuing strength of the Western European chemical and pharmaceutical firms - were all reasons not to write off European capabilities. The poor performance, I suggested, was concentrated primarily in the information technology sectors - a view subsequently endorsed by the work of Keith Pavitt and Pari Patel - and the problem was not one of technology but of management.

The purpose of this lecture, five years on, is to ask the question "What has changed?" In it I propose to review developments and to chart what I believe to be a sea change in management attitudes and perspectives within European industry and the ingredients that have contributed to that change. Of these, there is little doubt that 1992 - the opening up of the European market of 320 million people to full and open competition amongst the firms of all twelve nations that today constitute the European Community - is now an important contributor. But my thesis is that 1992 is itself the product of other changes that have been taking place within the European Community, changes brought about partly by external competitive pressures and partly by internal institutional developments. These have had a significant effect upon perceptions of competition and have stimulated a reaction which in turn has helped to rekindle something of the vision and the excitement which accompanied the early development of the Community in the 1960s.

While my story is one of achievement, it is also one of caution. I might alternatively have given this lecture the title which I have recently given to the final chapter of a book on Anglo-French experience which my colleague Peter Holmes and I have just sent off to the publishers = "Farewell to the National Champion" (Sharp and Holmes, 1989 forthcoming). There is much talk today of Fortress Europe and there is clearly a danger that we may end up replacing national champions with European champions. To my mind this would be a tragedy for it would throw away much that has been achieved over the last ten years. I conclude this lecture, therefore, by suggesting that the task for the Community during the next five years is not only to maintain current successes, but to reinforce the pressures for competition by developing a competition policy which bites, and by recognising that trade and competition policy go hand in hand.

2. The Reign of the National Champions

To explain the significance of developments in the last five years it is really necessary to go back to the rise of the national champions in the 1960s and 1970s. At this time, European governments were not obsessed by any technology gap between Europe and the United States - indeed many of the leading technologies of that era, such as space technology, the jet engine, and nuclear power, had emanated from European research, even if the United States was showing us how to exploit them. European governments were, however, obsessed by size. Mass production techniques and the continuous process technologies had been developed in the United States in the first half of the twentieth century to match the relative scarcity of labour and high labour costs of that country. But the higher capital intensity of plant in the United States also meant higher productivity, and it was this aspect of US performance that attracted European attention in the 1950s and 1960s. The "catching up" of this era which helped to boost growth rates and raise productivity and living standards was largely a matter of catching up with American organisation and production technology. In those days, once set up, with machine tools and jigs tuned to fine tolerance, capital was inflexible and economies of large scale production of considerable importance. Big was beautiful, and as Servan Schreiber argued so persuasively in his book Le Defi Americain (Servan Schreiber, 1965), Europe could only compete with the likes of IBM or General Motors by growing firms of equivalent size.

Such was the climate in which the British Industrial Reorganisation Commission (IRC) in the late 1960s acted as marriage broker to firms such as British Leyland, ICL and GEC. The French government, admittedly further spurred by US refusal to furnish the necessary super-computer to back their independent nuclear 'force de frappe', introduced successive Plan Calculs aimed at making CII and Bull computer manufacturers of the first order. Less ostentatiously the German government channelled substantial subsidies towards Siemens in support of its computer and component activities, while Philips, at that time one of the few truly European multinationals, worked with a highly decentralised organisation in which each national grouping was semi-autonomous, and encouraged subsidiaries such as Mullard, to be seen as a national firm, close to government and in receipt of any subsidies that were going. In telecommunications, run in all European countries by PTT public authorities, relationships between the private manufacturers of equipment and the public network authorities were openly incestuous and noone questioned the nationalistic purchasing practices or, indeed, the sharing of order books among the major firms.

By the 1970s, therefore, most of the national champions were already in being, but their position was enhanced by the events of that decade, dominated as it was by the two oil crises, inflation and the major recession of 1974-75. In retrospect we now see the 1973 oil crisis as marking an important turning point in post-war industrial development, the point at which more or less simultaneously industrial expansion predicated upon cheap oil supplies and the American mass production paradigm both ceased to hold sway. At the time, it was by no means clear whether these events were merely a blip, albeit a big blip, in trend, or whether they had deeper implications. Given the uncertainty, governments were much reassured, and much influenced, by the McKracken Report in late 1977 (OECD, 1977) which told them that, having got over the oil crisis, it would be business as usual. This helped to provide justification for the array of subsidies and other protective arrangements which had sprung up in the late 1970s and aimed primarily at preserving employment in industries ranging from steel and motor cars to chemicals and man-made fibres. If unemployment fell back to normal levels, it was assumed these subsidies would automatically dissappear. In the meantime the subsidies and other favours bestowed upon national champions were lost among the swell.

How wrong was the advice from the McKracken Report became apparent fairly rapidly. By 1980, the OECD was labelling the employment subsidies then widely prevalent in European industry 'negative adjustment', and urging governments to shift from negative to positive adjustment policies (OECD, 1983). For it was at this time - at the turn of the decade - that European firms and governments, having contemplated their navels for much of the 1970s, suddenly became aware of the major developments in technology that had been taking place across the Atlantic. In Britain, this awakening can be dated almost precisely to a Horizon television programme in February 1978 called 'Chips with Everything', which was followed in rapid succession by the publication of an ACARD report on microelectronics (ACARD, 1978) and the announcement that the Government was backing a National Enterprise Board initiative to establish a British owned chip company - Inmos. In France it was marked by the transformation of 'télématique' into 'informatique' as the Direction Generale des Télécommunications, having successfully modernised the French telephone network in a matter of seven years, set its sights on mass interactive video communication through Minitel. In West Germany it came with the EWS-A fiasco, when Siemens designs for an analogue-based switching system for the German telecommunications network were consigned to the wastepaper basket as being ten years out of date.

3. The Semiconductor Industry - A Seminal Diversion

The semiconductor industry provides as good an illustration as any of the position in which European industry found itself at that time. It also helps both to explain the pessimism that existed in the early 1980s and to provide pointers to later experience.

It is well known that the transistor was discovered in the Bell Labs in the US in 1947, but many are unaware that an important anti-trust settlement in 1956 laid down that AT&T should manufacture only for internal use and should make the patents freely avaiable to any who wished to use them. From this important decision grew Silicon Valley, for it enabled small, specialist companies such as Fairchild, Texas Instruments, Motorola and National Semiconductor to establish themselves and develop markets for their products without fear of being swallowed up or drummed out of business by the big predators. While military programmes were also seminal in providing development finance, it was these small firms which pioneered, from the transistor, first the semiconductor and subsequently the intregrated circuit. These firms grew size and importance as 'merchant' producers of semiconductors, and as they grew they established subsidiaries in Europe; first, in France and Britain in order to gain access to the lucrative defence markets, and later, as civilian markets grew in importance, in Germany and the Netherlands. Escaping the 17 per cent tariff these firms competed in the European market side by side with indigenous producers, the most important of which, in the late 1960s, were Siemens and Philips, but companies such as Ferranti, Plessey, GEC (Elliott Automation), SGS and Thomson all had a sizeable presence in the market.

All this was to change in the early 1970s, when the semiconductor industry hit major recession, the first of the periodic cycles of feast and famine which have since become such a feature of this industry. The American firms used the occasion to cut prices aggressively in an attempt to gain market share, and it had the desired effect. Many European firms pulled out of the mainstream 'commodity chip' markets on the grounds that they were too risky, and retreated into the relative safety of the niche 'custom chip' market where products are bespoke and prices appropriately inflexible.

Writing about these developments in 1977, Sciberras described how the market had effectively divided itself into two, non-competing segments - the Big League firms, dominated by the Americans, manufacturing mainstream memory or commodity chips; and the Little League firms in the custom chip segment of the market - which were self-perpetuating. "The dominant US multinationals", he wrote, "are able to obtain the elimination of competition by pricing at a level which ensures volume economies, through the pre-emption of the mass standard device market, and at the same time long run profits" (Sciberras, 1977:273). In other words, thanks to high R and D entry costs and learning curve advantages, dominant firms could, by these tactics, maintain their domination and prevent new entry. But the other side of that coin meant that, once out of the market, it was very difficult to get back in. Of the European firms, only Philips really had a claim to be in the Big League; Siemens output was relatively large but geared to internal consumption; Thomson continued to manufacture memory chips, but in relatively low volume at government insistence. The three British firms, GEC, Plessey and Ferranti, had all pulled out of mainstream manufacture, as had the Italian producer SGS (Dosi, 1981).

Sciberras' thesis held for the best part of ten years. From the mid-1970s to the mid-1980s the US multinationals dominated the European industry seemingly unchallenged. World-wide, however, their position was challenged by the rise of the Japanese semiconductor producers. Spearheaded by the MITI VLSI (very large scale integration) programmes of the mid-1970s, the major Japanese electronics firms - Hitachi, Toshiba, NEC, Fujitsu and Matsushita - broke into the market using the same tactics as their US counterparts a decade earlier. They concentrated their research on the next generation of chips, entered ahead of their US competitors, cut prices in anticipation of volume sales, and effectively pre-empted markets. They also succeeded in mastering the production technology and producing a quality and reliability hitherto unknown. As Table 1 illustrates, in the 1970s the Japanese had no major presence in the industry; by 1985 they were dominating the market. For the Europeans, however, it left an awkward question. If the Japanese could achieve it - could break out of the Little League into the Big League - why couldn't their firms?

4. The Crisis of the Early 1980s

The early 1980s therefore brought, on the one hand, a realisation that microelectronics and its applications in manufacturing and information technology were going to be vital to competitiveness in all industries (and the high-teching of low tech industries was just as important as promoting the high tech industries themselves) and, on the other, deep pessimism as to whether Europe was capable of responding to the competitive pressures building up in these sectors. As we have seen, most of the European firms

TABLE 1. THE TOP TEN PRODUCERS OF INTEGRATED CIRCUITS 1973-1985

1973	1979
o Texas Instruments (US)	o Texas Instruments (US)
o Motorola (US)	o National Semiconductor (US)
o National Semiconductor (US)	o Motorola (US)
o Fairchild (US)	o Intel (US)
o Signetics (US)	o Fairchild (Schlumberger - French)
o American Microsystems (US)	o Philips (Netherlands)*
o Intel (US)	o Mostek (United Technologies - US)
o RCA (US)	o Advanced Micro Devices (AMD-US)
o Rockwell (US)	o RCA (US)
o Mostek (US)	o Harris (US)
1983	1985
o Motorola (US)	o NEC (Japan)
o Texas Instruments (US)	o Texas Instruments (US)
o NEC (Japan)	o Hitachi (Japan)
o Hitachi (Japan)	o Motorola (US)
o Toshiba (Japan)	o Toshiba (Japan)
o National Semiconductor (US)	o Philips (Netherlands)*
o Intel (US)	o Fujitsu (Japan)
o Fujitsu (Japan)	o Intel (US)
o AMD (US)	o National Semiconductor (US)
o Philips (Netherlands)*	o Matsushita (Japan)

* Includes Signetics acquired in 1978

Source: Dosi (1982) and Financial Times

had already pulled out of mainstream semiconductor production in spite of the general recognition that this sector provided the leading edge to the industry. In other sectors, although they had received substantial subsidies over many years, neither ICL nor Bull could hold their own against IBM in computers; in telecommunications, long considered a sector where European firms had had an edge on other competitors, Siemens' EWS-A fiasco had shaken confidence and it was increasingly clear that, with the next generation of digital switches requiring an R and D expenditure of approximately $1 billion for a life of uncertain length, Europe could no longer afford the luxury of seven different manufacturers geared largely to national markets. Finally, in consumer electronics, the Japanese, thwarted from exporting by the rapid proliferation of bilateral voluntary export restraints, were steadily increasing their market presence through inward investment, mainly into Britain and West Germany; and in both countries indigenous manufacturers were in difficulties. If these troubles were not enough, there was a new threat was on the horizon - with deregulation in the United States, AT&T had been released from its former commitment not to participate in foreign markets, and IBM similarly given the go-ahead to diversify into telecommunications markets. Pressure from US multinationals, therefore, looked set to increase not decrease, while the amazing advance of the Japanese in all sectors of electronics showed no sign of slowing.

It is necessary to qualify this scenario. As the work of my SPRU colleagues, Keith Pavitt and Pari Patel, has demonstrated so forcibly the picture is not uniform. There is not time to take you through their analyses in detail, but Tables 2 and 3 pick out some of the highlights of their findings. Using US patenting data and disaggregating by country and

TABLE 2. SHARES IN US PATENTING BY WESTERN EUROPE

	1963	1969	1976	1983
W Europe	15.5	19.5	24.0	23.1
of which (as % W Europe)				
FRG	33.9	35.9	38.4	43.4
France	12.4	14.2	15.0	15.2
UK	26.3	25.0	18.6	15.4

Source: Patel and Pavitt, 1988.

TABLE 3. REVEALED TECHNOLOGICAL ADVANTAGE*
1963-83

EUROPE'S TOP SEVEN	EUROPE'S BOTTOM SEVEN
Agricultural chemicals (2.568)	Petroleum and gas (0.414)
Drugs and medicines (1.529)	Food and kindred products (0.749)
Industrial organic chemistry (1.429)	Farm and garden machinery (0.818)
Special industrial machinery (1.362)	Radio and TV (0.826)
Nuclear reactors and systems (1.320)	Electrical components and telecoms (0.859)
Engines and turbines (1.294)	Office computing and accounting machinery (0.868)

$$* \frac{\text{European share of US patents in sector}}{\text{World share of US patents in sector}}$$

Average = 1; >1 = above average; <1 = below average

Source: Patel and Pavitt, 1988.

sector shows the problems concentrated particularly on UK performance, and in the electronics and information technology sectors (Patel and Pavitt, 1988). West Germany comes out particularly strongly and broadly speaking the chemical, pharmaceutical and specialist engineering sectors record above average performance.

Let us therefore take stock of Europe's position in the early 1980s:

- Most of the high technology sectors were dominated by national champions, whose position had been reinforced by the rise of protectionism in the 1970s;

- Europessimism arose from belated recognition of the importance of new technologies, particularly information technology, and a lack of confidence in the ability of European firms ever to improve their performance having once fallen behind;

- Poor performance seemed less a matter of size (most of these firms were large enough to benefit from the most important economies of scale) or of access to technology, than of a willingness to seize opportunities when they arose;

- The worst performers were in sectors in which protection was highest either as a result of public purchasing barriers or of voluntary export restraints.

5. Davignon, ESPRIT and All That

This was the background against which Vicomte Davignon, EC Commissioner for Industry and (after 1982) also for Research and Technology, established his Round Table of Industrialists, gathering together the managing directors of the twelve largest electronics firms in Europe and confronting them with the state of their industry and the imminent competitive threat from the US multinationals and Japan. Fragmentation of the market among national champions, he told them, was depriving the industry of the one major advantage it had over its US and Japanese rivals, namely the European market of 320 million people, while the absolute protection afforded by public purchasing in such important areas as defence and telecommunications meant too much concentration on lucrative home contracts and insufficient attention to competitiveness in world markets. With the increasing importance of civilian markets in electronics, and the advent of satellite and cellular telecommunications, their markets were far from inviolate. Unless they improved performance they were in great danger of finding themselves "rolled over" by their American and Japanese competitors.

His aim was to establish a MITI-type programme of collaborative R and D to be called ESPRIT - European Strategic Programme for Research in Information Technology - something the Commission had actually been trying to get off the ground since the mid-1970s but which had, until Davignon's initiative in 1980-1, fallen upon deaf ears. His initial proposals were modest - a pilot scheme in which the twelve companies could participate for one year to see whether they thought it worthwhile. The response was favourable and by December 1982 the Commission had the go-ahead for the pilot phase costing 11.5 Ecus (£7.5 million) to last through 1983. This in turn led to the first phase of the full ESPRIT programme for the years 1984-88 with Community expenditures of Ecus 750 million (approximately £500 million) which has now been succeeded by the second phase with expenditures of Ecus 1.6 billion (£1.1 billion). Community funding is matched £ for £ by industrial funding, hence total expenditures in the first phase amounted to about £200 million a year, and in the second phase to double that amount - about £400 million a year.

Symbolically ESPRIT has been of far greater importance than either its expenditures (which at approximately £200 million a year to date have been less than most governments have been putting in their information technology sectors), or the specific projects, would imply. Concentrating, as it has in Phase I, on precompetitive research, the emphasis has been less on products that can be brought to market than on the development of tools and techniques to enable such products to be developed. There have been successes, prime amongst which is the use of the Inmos transputer in the Parsys supercomputers developed jointly with the French; but one of its main achievements has been in the field of standards were work on developing software standards for manufacturing and office automation systems has been invaluable in opening national markets to other European manufacturers.

ESPRIT has been important for a number of reasons.

(a) First, it marked a new departure in style for Commission programmes. Gone were the heavy handed, top down projects seen, for example, in the 1960s for Euratom, or in the 1970s for Unidata (Sharp and Shearman: 1987): "in" were 'demand led' projects where collaborative teams of companies and research institutes bid by project in broadly defined programme areas; and "in" were the Task Force, a specially recruited team of bureaucrats, many on secondment from industry, who's task was to cut through the red tape, select the projects to be funded, get them moving and monitor their progress.

(b) Secondly, it provided the model for subsequent programmes. There has been, as you will know, a proliferation of programmes from Brussels with names such as SPRINT (Strategic Programme for Innovation and Technology Transfer) and BRITE (Basic Research in Industrial Technologies for Europe), and most of them have followed the basic ESPRIT formula of demand-led projects master-minded by a Commission-based task force. The biotechnology programmes have, to date, had little industrial input, and other programmes such as COMMETT (Community Programme in Education and Training for Technology) have tended to be led by the educational side. But the three most important (and most expensive) projects - ESPRIT, RACE (Research in Advanced Communications Systems for Europe) and BRITE are all firm-led programmes, with tight timetables and monitored schedules.

(c) Thirdly, ESPRIT proved to be a turning point in confidence. We shall be looking shortly at the considerable number of privately sponsored collaborations, joint ventures and mergers which begun to burgeon in European industry in the mid-1980s, and which have contributed markedly to the reshaping and restructuring of European industry. ESPRIT was, to my mind, seminal in making this happen. In the first place, it provided a channel for cooperation between these European firms, a channel that had until this time been noticeably absent - firms had licensing or distribution agreements with US or Japanese firms, but not with other European firms since they tended to service Europe from the home base. In the second place, ESPRIT served as a mechanism for creating, among top decision-makers, convergent expectations about the future. The power of such convergence should not be underestimated for it becomes self-fulfilling - if all decision takers make investment decisions in the light of common expectations, production will expand as expected! The Japanese VLSI and Fifth Generation Programmes are based upon this principle; MITI effectively acts as a mechanism which ensures that all firms act on a common set of expectations which then have a tendency to become self-fulfilling. In the case of ESPRIT, Davignon's Round Table fulfilled this same function. For the first time, Europe's fragmented electronics industry confronted the threat of competition together. They discovered that there was among them the common expectation that competition would get tougher, that tariff and other protective barriers were ineffective given inward investment and the free mobility of capital, and that national champions protected by public purchasing ran the risk of being out of touch with market developments. Thus these major European companies came to recognise that to compete successfully even within Europe they needed to set their sights on global markets and global competitiveness.

(d) Finally, ESPRIT has created an important constituency pressing for the completion of the internal market and the abolition of all remaining internal barriers to trade, such as divergent standards and regulations. Once the major electronics firms had discarded their 'national champion' role, it was logical that they should begin to look to Europe as their 'home base' and to see the divergent European standards, for example on data transmission, as major hindrances in the effective operation in those markets. This has been reinforced by the very success of the programmes within ESPRIT aimed at establishing Europe-wide standards for IT products.

6. Joint Ventures and Mergers - The Reshaping of European Industry in the 1980s

My thesis is, however, that ESPRIT has been a catalyst for a far wider reorganisation of European industry affecting both high technology and low technology sectors. The overall picture is best given by two sets of figures, one relating to joint ventures and the other to mergers. The figures on joint ventures (Table 4) show clearly the overall upward trend over this period in joint ventures. It also shows that although joint ventures within the Community almost doubled between 1983 and 1985, joint ventures with firms outside the Community exceeded those within the Community; indeed in 1986/87 they were almost three times those of the Community.

These figures fit well with what we know to be happening on the ground. There are two distinct movements. One relates to technology. One of the rational reactions to perceptions of the technology gap in the early 1980s has been for European firms to buy-in the process technology they were missing, primarily from outside the Community. Collaborations within the Community have tended to be concerned with new product development. Hence, for example, in 1982/3 Siemens and Philips combined in what is termed the mega-project to develop, first, a 1 megabit chip and subsequently a 4 megabit chip. At the same time Siemens teamed up with Toshiba in order to "import" the production technology for the project, and admits that without Toshiba's help they would not have achieved their target. In a different area, Philips teamed up in 1983 with AT&T to develop its telecommunications interests, a field in which its own technological base was not strong and where it hoped, through the joint venture, both to develop its European interests and to gain access to US markets.

TABLE 4. JOINT VENTURES IN THE COMMUNITY

	1983/4	1984/5	1985/6	1986/7
National	32	40	34	29
Community	11	15	20	16
of which Chemicals	2	0	7	1
Electrical and Electronics	1	3	4	3
International	26	27	27	45
of which Chemicals	5	7	9	10
Electrical and Electronics	10	7	5	14
TOTAL	69	82	81	90

Source: Commission of EC, 1988.

Table 5 gives an overall picture of merger activity. The two most active areas for both joint ventures and mergers have been, as you might imagine, chemicals and electronics, but whereas they were level pegging in joint ventures, the chemicals sector has been by far and away the most active in mergers as companies such as ICI consolidate their position in speciality chemicals. Looking at the table as a whole, perhaps the most interesting feature is the sharp rise in Community mergers in the year 1986/87 and the relative drop in other international merger activity. It is reasonable to speculate that the commitment to 1992 which came to the fore in 1985/86 with the Single European Act and Lord Cockfield's White Paper (Commission of the EC, 1985) had some effect on this merger activity.

I should like to go further, however, and suggest that there is a progression from collaboration, to joint venture and then to merger, and that the lessening of joint venture activity in Europe is because it is now being superceded by merger.

Let us start by considering collaboration. What motives underlie it? We have already identified two - access to technological know-how and access to markets - and implicitly identified two others - R and D costs and uncertainty. In the case of both semiconductors and telecommunications these latter factors have been very important. A combination of high up-front R and D costs (for semiconductors approximately £300 million now for each new generation of chip; for public switches in telecommunications approximately £700 million) with great uncertainty about product life, and hence the period of premium markets during which such investments can be recouped, makes the sharing of R and D costs both logical and sensible.

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TABLE 5. MERGERS IN THE COMMUNITY: 1983-87

	1983/4	1984/5	1985/6	1986/7
National	101	146	145	211
Community	29	44	52	75
of which Chemicals	13	23	28	27
Electrical and Electronics	2	5	0	6
International	25	18	30	17
of which Chemicals	11	5	6	6
Electrical and Electronics	2	4	3	2
TOTAL	155	208	227	303

Source: Commission of EC, 1988.

Not only does the firm limit its own commitment of resources to such projects, but it ties potential competitors into the same game and, perhaps most important, into the same losses if the project turns sour. This helps to explain why in periods of major technological change, when there is genuine uncertainty about technological and market feasibility of new products, cooperation becomes the rage. Remember the trusts of the 1880s and 1890s; the research associations and cartels of the 1930s. Anti-trust laws today inhibit explicit cartels. But it is no surprise that we see in the US at present pressures to exempt R and D cooperations from the rigours of anti-trust, and the emergence of groupings such as the SIA (Semiconductor Industry Association) and the MCC (Microelectronics and Computer Technology Corporation). In the EEC, collaborations for the conduct of precompetitive R and D have block exemption from examination by the Commission's anti-trust arm, which is why there is such emphasis, (sometimes one suspects, misplaced), on the precompetitive nature of the collaborations.

It should be recognised that collaborations are by their nature of limited duration. Schemes such as ESPRIT have a time limit, but even private collaborations are usually ad-hoc affairs put together to solve a particular problem and dissolved when that problem is cracked. Unsuccessful collaborations dissolve and we hear nothing more of them. Remember the GEC - Fairchild collaboration over micro-chips? Successful collaborations, for example, that between the Italian semiconductor from SGS and the French Thomson, may develop into joint ventures. And successful joint ventures, for example that between Thomson and Thorn-EMI's Ferguson television and video-recorder interests, often end in merger - as indeed Thomson has now taken over Ferguson. Unsuccessful joint ventures, such as the Hitachi-GEC or Rank-Toshiba links, often also end in one partner buying out the other. Collaborations and joint ventures are, therefore, frequently a prelude to merger, to be seen very much as a "toe in the water"/"see if you get on" phenomenon.

With this in mind I should like to return briefly - and for the last time - to the electronics industry in Europe and to bring you up to date with developments. Time does not permit me to do more than sketch in what has been happening, and I should like to concentrate on three sectors, semiconductors, consumer electronics and telecommunications.

(i) Semiconductors

We have already discussed the position of the European semiconductor industry, its retreat by the early 1980s from mainstream memory chips, the fast rise and the impending entry of the Japanese producers. We posed the question as to why the Japanese could break the dominance of the US firms, while the Europeans had failed. This was a question at the forefront of the Davignon initiative, particularly since one of the advantages held by the Japanese was seen to be the fact that they were large integrated electronics firms, with substantial internal markets for components in their consumer electronics and office automation arms - precisely the advantages that should have been available to companies such as Siemens, Philips, GEC and Thomson. Such markets provided both some guarantee of output stability and an ability to cross subsidise the heavy R and D costs.

The ESPRIT project and the Philips-Siemens mega project came simultaneously in 1982/3. The strategy was the same as the MITI VSLI strategy, to identify forward positions on the technological trajectory and aim forward, leapfrogging intermediate stages. Philips and Siemens claim they never intended trying to beat the Japanese (and the Japanese have been well ahead of these firms in marketing their 1m and 4m chips), but needed to gain hands-on experience in the sub-micron technologies in order to remain competitive in the production of other, more specialist semiconductors and to make proper use of such products in their consumer electronic and computer products. Be that as it may, the JESSI (Joint European Semiconductor Silicon) project announced last year as the successor to the mega-project aims explicitly to overtake the Japanese in the production of the 16 megabit chip (Financial Times, 15 March 1988). Meanwhile, Thomson, the other major European manufacturer of microchips has teamed up in a joint venture with SGS-Ates of Italy which also aims at megabit technology - indeed is likely to participate alongside Philips and Siemens in the JESSI initiative.

Thomson-SGS are also Europe's leading producers of ASIC semi-custom chips, which has been the fastest growing area of semiconductors in the last five years. This was a technology discovered and pioneered by Ferranti and is yet another sad tale of missed opportunity. Today it is Japanese and US firms who are the market leaders. Ferranti's semiconductor interests were last year bought out by Plessey, which is the liveliest of the British players in this field. This brings us right up to date and helps to explain Siemens interest in Plessey, and why Thomson is seen as an obvious White Knight.

(ii) Consumer Electronics

The story in consumer electronics has its similarities, but also its surprises. The early history is familiar; the fast growth of the industry through the fifties and the sixties as, one product after another - black and white TV, high-fi, the transistor and then colour TV - hit the market; the rise of the Japanese and SE Asian producers; increasing import penetration and the use of voluntary export restraints (VERs) to hold back the tide, which in turn brought inward investment, especially into the UK and W Germany. Philips is the major European producer, and has had a highly innovative record. But its record in marketing is less good and significantly it failed to clinch its advantage in the development of video recorders and allowed JVC to run away with the dominant VHS standard. Philips has also traditionally been a highly protectionist company, and the VCR experience seems to have influenced them to leave no protectionist stone unturned, even though the logic of inward investment would suggest that, where capital is mobile, protection is in the long run self defeating. By the early 1980s, both British and German manufacturers faced overcapacity in colour TV manufacture; with the exception of Ferguson (Thorn-EMI) the British pulled out, leaving the field to the Japanese, just as their US counterparts had pulled out of the US market. Philips and Thomson, long time rivals, fought over the two German firms - Grundig and Telefunken, with Philips finally carrying off the bigger prize of Grundig.

The Grundig affair determined both firms, in their separate ways, not to follow the route of the British firms and abandon consumer electronics. For Philips, 30 per cent of whose sales come from this area, it was an essential part of their integrated operations, providing markets for a wide range of the components they produced. Thomson, having been forced as a nationalised firm to give up in 1983 their telecom interests to CGE, saw logic in the same route, although their tactics of growth through acquisition and concentration on offshore assembly lines, have been very different from the solid internal growth and product development favoured by Philips. In 1984, they acquired Telefunken; worked in joint venture with Thorn-EMI until, in 1987, buying out the Ferguson TV and VCR plants from Thorn; and then, most spectacularly, in July 1987 bought out the US TV interests of RCA. Philips and Thomson are now working together, for the first time, on the EUREKA high definition TV project, but it still has to be seen how compatible they will find each other. Meanwhile, an outsider, the Finnish paper company, Nokia, has moved into consumer electronics and, via acquisition, rapidly moved into third place as a European based manufacturer, its 'lucky break' coming with the purchase from Alcatel of the former ITT television manufacturing subsidiaries in W Germany and Belgium.

(iii) Telecommunications

The story in telecommunications is similarly one of coalescence. Until the early 1980s the traditional suppliers of telecommunications equipment in the different countries were shielded by their respective PTTs from competition and market incursion. Thus in 1984, there were seven major European manufacturers of telecom equipment - (in order of sales) Siemens, ITT, Ericsson, Alcatel, Plessey, GEC, and Italtel. The market was not big enough for all to survive; the question was when and how the break would come.

In fact it came surprisingly late and very suddenly. In January 1987 the French company CGE, parent of Alcatel, announced that it was taking over the telecom interests of ITT in Europe. This immediately made Alcatel into a company of a size similar to AT&T, dwarfing Siemens, which had been the dominant European company. Siemens meanwhile had been developing its own market in the US, linking up with GTE, buying the specialist switching company Rolm, and using this as a base from which to get accreditation with the new, deregulated Bell companies. Ericsson subsequently bought up the smaller French company, CGCT, thus cementing the three major 'poles' in the European telecommunications equipment scene - Alcatel, Siemens and Ericsson. Italtel meanwhile cast its lot with AT&T, and GEC and Plessey - left out in the cold by the European merger movements - eventually merged their own telecommunications interests in late 1987 to form GPT.

You can see now why the Siemens/GEC takeover bid for Plessey is the last card to fall into place in the reshuffling of this pack. Amongst the European electronics companies, they were the only ones untouched by the coalescence that had been taking place within Europe. From Siemens point of view the deal is attractive, given the entrée it provides into the British market when System X comes to be upgraded, as well as access to Plessey's ASIC semiconductor technology. GEC has belatedly woken up to the need to build bridges into Europe and is rapidly building up its own defences by a series of joint ventures. Whatever the outcome of the Monopolies and Mergers Commission enquiry, one suspects there is still another scene to come. A link between Thomson, or SGS-Thomson, and Plessey has its logic, while acquiring GPT would be AT&T's last chance to get a major foothold in the European market.

7. The Reinforcement of Competition

It is already apparent that what has been happening amongst these European firms in the 1980s amounts to a major restructuring of industry, away from home-based national champions to becoming global players in the global market place. The pace of change has been fastest where it had been slowest before - where the barriers to entry had been highest and most protective. It is not just electronics and telecommunications: similar metamorpheses are taking place in the heavy electrical sectors (where nationalised electrical undertakings had protected their champions), in banking and insurance, in food manufacturing and among the construction companies. We noted earlier the considerable number of mergers in the chemicals sector. Yet here the process has been going on for longer, since companies such as ICI, Akzo in the Netherlands, Bayer and Rhone Poulenc have for long had little in the way of protection and have seen themselves as global companies for the best part of the last two decades.

How far has this restructuring been reflected in performance? Unfortunately the latest OECD statistics for what is defined as high-technology sectors relate back to 1985 and therefore cannot reflect the developments we have discussed. There are a few straws in the wind which might be taken as cause for optimism. For example, while the US computer industry has been stagnating, the main six European producers - Siemens, Bull, Olivetti, Nixdorf, ICL and Philips - have all been experiencing a 25 per cent growth rate; the British Parsys and the French Talmat mini-computers are reputedly three times faster than their US opposition; and with Philips and Siemens both putting 6 per cent of turnover into R and D, European firms are beginning to match Japanese performance (Le Monde, 3 November 1988; and The Economist, 4 February 1989). But having said this, it is very apparent that both French companies - Thomson and CGE - have grown fast through merger and acquisition, and have yet to show that they are capable of handling so wide a diversity of assets. I am, however, an optimist. The restructuring we have seen in European industry in the last few years was part of a necessary shake-out of the industry, and I believe that the combination of this restructuring with the competitive pressures which brought it about, have improved management performance in the electronics and information technology sectors. I stress, however, both sides of the equation. Restructuring by itself is not sufficient. The key factor is the perception of competition. It was the threat of competition in the early 1980s that woke management up, and for that improvement to be maintained, the pressure of competition has to be maintained. This is why 1992 is so important, for it represents a commitment on the part of Community governments to abandon all these protectionist, nationalistic practices which have for so long be bolstering their national champions; and alongside that commitment is the expectation on the part of industry that this will be so. Once again, the perception of competitive pressures in the future can act as a spur to performance improvement today.

There is, of course, another way of looking at all this. The threat of competition also stimulates the search for security. The collaborations and mergers we have surveyed can alternatively be viewed as the logical way of avoiding competition. Have we rid ourselves of national champions only to reinstate them as Euro-champions?

As yet, I think the answer is "No" - but there is great danger that we may do so if we are not vigilant. That vigilance has to be maintained in two different, but mutually reinforcing directions.

The first direction is trade policy. Consumer electronics is often quoted as the prime example of the tendencies towards Fortress Europe, but I would remind you that sectors such as office equipment, computer peripherals and motor cars also suffer from the panoply of "voluntary" export restraints, rules of origin and anti-dumping duties. However, consumer electronics illustrates the dangers of the Community's current approach. On the one hand the Community is preaching the virtues of competitiveness; on the other, it gives way time and again to demands from Philips or Thomson for voluntary export restraints or anti-dumping duties. By doing so they not only encourage Philips and Thomson to tolerate higher production costs, but also signal that they condone a situation which allows the Japanese to come up with the new products and Philips and Thomson to come in as second round innovators, supported when necessary by anti-dumping duties or similar protective measures. Yet in a world in which competitiveness depends upon new product innovation, following is not good enough. The response to pleas for protection should not be a sympathetic ear. But on the contrary, exhortation to innovate and keep ahead of the game.

The other direction of viligance must be competition policy. Community competition policy derives from the powers delegated to the Commission under Articles 85-94 of the Treaty of Rome. During the 1980s the Commission's actions in this area have acquired increasing authority. They have pursued cases of abuse through to the European Court, and the penalties imposed have been substantial giving credibility to their actions. Their responsibilities primarily lie in cases which cross national boundaries, and partly for this reason, little consideration has until recently been given to merger issues. However, an important European Court ruling in 1987 (ECJ, 1987) argued that the Commission's powers under Article 85 and 86 to intervene to control monopoly and restrictive practices logically implied powers to veto major mergers which might lead to anticompetitive outcomes.

Let us just stand back for a moment and look at this issue in perspective. On the one hand we welcome the mergers and restructuring that has been taking place; indeed The Economist recently (4 February 1989) was lamenting the prevalence of joint ventures and the absence of mergers. On the other we are creating organisations which are, at the moment, genuinely beyond national control. The Rowntree/Nestlé merger last summer for the first time brought home to many people how futile it was to judge such mergers on the basis of British competition alone. A fortiori this is true of the Siemens/GEC/Plessey affair. Yet, at present, Community mergers policy is embryonic, and Britain and West Germany are still holding out for restricting powers of review only to mergers which involve joint assets of more than 10 billion Ecus (about £7 billion) - a level which would net the CGE-ITT merger but not the GEC/Plessey bid.

It is not for me fortunately to have to justify the total inconsistency of the Government's stance on this issue. I should like, however, to make my own position plain. My own view is that it is essential that the Community expands its anti-trust activities as rapidly as possible, and that such activities should include both powers to review and reject mergers and also responsibilities for monitoring and reviewing the activities of dominant firms. We saw in the case of the Bell labs transistor patent how beneficial to enterprise was the tough stance by the anti-trust authorities on that occasion, and I do not think it would be inappropriate to model the European system on the tough anti-trust laws of the US, including within the system not only the monitoring and control of dominant enterprises, but a strong presumption against large mergers. There are good empirical grounds for setting the asset limit low and taking a sceptical line on such mergers. Leaving aside a few areas such as telecommunications switching systems and mainstream memory chips (to which we have perhaps given undue attention in this lecture), the evidence on economies of scale suggests that in many industries neither the minimum efficient scale of production nor learning curve economies justify mammoth firms. From the UK we now have considerable evidence, too, about the unsatisfactory history of mergers (see UK Government, 1988) and their failure to achieve many of the promised gains. As we have seen this afternoon, there is a massive restructuring of industry taking place. Some of it is justified: some is not. We must have a policy which allows us to discriminate.

Is a tough European competition policy enough? We have spoken of the new enterprises emerging from this restructuring as "global players in the global market place" and they join firms such as IBM, Shell, NEC, ICI, General Motors, as true multinationals, operating at a world level. The power and importance of these multinationals has grown throughout the post-war era as trade barriers have (on the whole) diminished and the importance of economies of scale, scope and learning, increased. By virtue of operating in many markets, the issue of control is dissipated. Indeed as one of my colelagues, Lesley Cook, described the position of Schlumberger, originally a French-based engineering company specialising in the oil drilling sector, it is "out of control" in the sense of being no longer subject to any specific set of national laws (Cook, 1985). And most multinationals are in this sense "out of control". We have only to look at our own experience in the 1970s when we tried to control Hoffman La Roche to recognise how slippery those multinationals can be.For a long time the issue has been side-stepped with the help of OECD and UN Codes of Practice and similar statements of good intent. But how much longer can we go on doing this? I think the time has come for this issue to be put at the top, not the bottom of the international agenda and for serious thought to be given to an international organisation, perhaps the GATT, to take up these issues and develop procedures which would be applicable on a reciprocal basis across the nations of the world.

8. Does 1992 Matter?

What then of 1992? This lecture has charted developments in European technology over the last ten years and has touched on the massive transition that is taking place. This transition is at its most dramatic in the reshaping of European industry with the emergence of European-based multinationals such as CGE, or, in another field, ASEA Brown Boveri. But underlying these changes in structure are changes in technology which are overthrowing the old logic of mass production and introducing a new flexibility and, with it, new forms of organisational structure into the production system. And there are also, as we have seen, new competitors entering the field. We charted the astonishing speed with which the Japanese launched themselves into semiconductor production, but there are other new players whom we have not mentioned - from South Korea, Taiwan, Singapore and Hong Kong - all of whose firms are pushing up-market, which, even in low technology areas, means using high technology methods.

Amidst these changes, 1992 is not an end in itself, but the means to an end. What was wrong with Europe ten years ago had little to do with technology and a great deal to do with management - what economists call the 'x' efficiency factor. If European performance has improved - as I, along with Le Monde, believe to be the case - it is because management has improved. In turn management has responded to the threat of competition: and the critical factor has been management's perception of that threat. In this lecture I have suggested that the Davignon Round Table and the ESPRIT programme, by providing a mechanism for sharing perceptions and arriving, thereby, at a common set of expectations, proved the catalyst for the changes that have taken place. In this context, 1992 - the commitment finally to abolish all internal barriers to trade in goods and services - is both a product of this new realism and a necessary bulwark to its continuation. It is vitally necessary that the continuing perception is one of tough competition.

Europe's competitive position may have improved, and the restructuring which has taken place may have played a part in helping improve performance, but the Community itself remains deeply divided between those who believe that Europe's interests are best served, at least in the short run, by some element of protection, and those who see the fostering of competitiveness via competition as the key to policy thinking.

Looking at it now, from the perspective of early 1989, it is by no means clear how Community policy will evolve. The restructuring that is taking place has undoubtedly increased concentration, and the Community's anti-trust policies are still only half formed, their offices understaffed and their procedures byzantine. Likewise, on the trade front, there are strong pressures towards Fortress Europe, which one sees perhaps most poignantly in the position of Philips in consumer electronics. Yet, and this is the key factor, the logic of 1992 points in the other direction, towards the reinforcement of competition. My position is plain. Europe has during the last five years benefitted from increased pressures of competition, and it is important that these pressures be maintained. This is why I argue for a tough competition policy, and action at the international level. And this is why I think 1992 matters because, amidst all these pressures pushing the Community in other directions, it symbolises a commitment to competition.

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THE EUROPEAN COMMUNITY AND NEW TECHNOLOGIES

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Section I - Introduction

The term 'the new technologies' is loosely applied to a number of fast growing sectors of the economy whose current success emanates, at least in part, from underlying changes in technology. Perhaps most obviously it applies to what is now termed the information technology sector - electronics, telecommunications, computers, robotics, and the associated hardware and software to create the networks and systems which link them all together. The biotechnologies provide another grouping in which developments in science are beginning to have major impact - so far mainly upon the pharmaceutical and health care sectors, but with potentially major impact upon agriculture, food production and processing, and the chemical industry. New materials technologies are themselves largely emerging from the chemicals sector but may have major impact upon metallurgy and the engineering industries, while an industry such as aerospace, as a major user of new technologies, helps to push the science and technology forward to meet new challenges and answer new problems.

New technologies have come to new prominence in the 1980s as the general slowing down of world growth rates has thrown a new prominence on fast growing sectors of the economy. The underlying movement is seen by some (see for example Freeman et al (1982)) to be part of the long term dynamics of the world economy in which economies oscillate between periods of rapid technological change, and the slower processes of assimilation and maturation; and by others (see Lawrence and Schultze (1987)) to be part of a man-made cycle of macro-economic mismanagement. Be that as it may, policies which help promote this process of change have been in vogue both at the national and international level. Each European country has its own panoply of programmes to promote new technologies, ranging from general measures to expand and promote the science base underpinning these fast growing areas of technology, to specific incentives to encourage firms to apply and use the new tools and techniques being developed.

These efforts have been mirrored at the Community level by a series of Community initiatives which, as time has gone by, have become more focussed and more effective. There is a sense in which cooperation in science and technology can be described as "the lowest common factor" of cooperation - at times when there has been little else to cooperate over, common programmes promoting scientific exchange or pooling funds on expensive research programmes have been dredged up to show a modicum of good will. Such "lowest common factor" policies tend, however, to be shallow - once crossed by national interests they have tended, as we shall see, to be discarded in favour of the national programmes. This is no longer the case: the need for collaboration is now backed by economic necessity. The interesting feature of the 1980s has been the demise of the national champion and the rise of European-based multinationals with a capability to compete at a global level. This chapter argues that the European Community programmes, particularly ESPRIT, have played a seminal part in this shifting of perspectives from the national to the global level.

Section II - Early Community initiatives in the promotion of new technologies

The concept of a European Technological Community has never been far below the surface for those seeking to create a united Europe. Indeed, it formed an explicit part of the programme of Jean Monnet's Action Committee for a United States of Europe[1], and was subsequently translated into an action plan in Christopher Layton's book, Europe's Advanced Technology: A Programme for Integration (Layton, 1969). It has recently resurfaced in the Narjes call in 1985 for the creation of a Technological Community to be centred upon the Community R&D programme and its various new technology initiatives (see below).

There has always, however, been an element of schizophrenia in the advocacy of a European Technological Community, and tension between the free market ideologues whose emphasis has been upon diminishing the internal barriers and inherent fragmentation of the European market, and the European chauvinists who have constantly warned against Europe's increasing dependence on American (and latterly Japanese) technology and whose vision centres upon a far more positive and interventionist approach. (Servan Schreiber (1967). See Williams (1973) for a discussion of these trends).

One of the reasons for this schizophrenia was that the Treaty of Rome did not endow the Commission with explicit powers to promote research, development, or for that matter, industry. It provided for a range of policy powers which could be used to determine the regulatory framework and help shape the market environment - competition policy, freedom of movement for capital and labour, the right of establishment, the regulation and harmonisation of state aids. But no general policy framework was established for either industrial or technological policy. This left the Commission to operate only through unanimous decisions of the Council of Ministers and hostage, therefore, to any national interests considered to be of over-riding importance. Belatedly the Single European Act has simultaneously both extended the Commission's competence to act in this sphere of policy and, of course, introduced majority voting. Together these have now greatly strengthened the Commission's role.[2]

The need to operate via consensus among the Council of Ministers helps to explain the stop-go nature of some of the early experiments. DG III, responsible for industrial affairs, ~~was not~~ established until 1967, and then took some time to decide what its proper role should be. Initially it decided on an active stance, encouraging trans-national mergers and the development of large European companies[3], but fell foul of, on the one hand, West German advocacy of free market principles and, on the other, the more interventionist philosophy of the French. Attempts in the early 1970s to create an Industrial Policy Committee under the joint auspices of the Council of Ministers and the Commission failed, leaving Community industrial policy in limbo until the turn of the decade.[4]

Science and technology policy, fared little better. 1967 saw the first meeting of the Council of Science Ministers, and in a flurry of activity they commissioned studies of the potential for Community action in six broad areas of technological development - transport, oceanography, metallurgy, environmental issues, data processing and telecommunications - but detailed discussion of proposals was held up by Britain's application for membership. Eventually the initiative led to the establishment in November 1971 of COST (European Cooperation in the field of Scientific and Technical Research), a grouping centred on the Community but comprising, in fact, all nineteen OECD Western European members including Switzerland, Sweden and Austria (Williams (1973)). COST has become a useful, if low key, framework for the preparation and implementation of pan-European projects of applied scientific research. But because of its extensive membership it has tended to shift outside the EC framework with separately negotiated agreements of cooperation for each project. Besides the original six areas identified for devleopment in 1967, it has added four more - meterology, agriculture, food technology and medical research. In the latter half of the 1980s, the COST framework has been overshadowed by the EUREKA initiative, embracing as it does a similar group of European countries but enjoying high profile encouragement from national governments anxious to play down Commission initiatives. (See Sharp and Shearman (1987) pp.28 and 59-60.)

In the computing sector where Servan Schreiber (1967) specifically warned of the growing power of IBM, European initiatives were particularly slow to get off the ground. Several attempts were made during the 1960s to develop cross-national groupings, but most turned out to be inconclusive. In 1962, for example, Siemens, Olivetti, Elliott Automation (later the core of ICL) and Bull began talks to create a cross-Europe grouping, but these came to nothing. Later, in 1969, the Eurodata consortium - ICL, CII, Philips, AEG-Telefunken, Saab and Olivetti - was established to tender for the ESRO (European Space Research Organisation) computer requirement, but this collapsed under pressure from the German government, largely because Siemens had been left out. The subsequent attempt in 1973 to bring Siemens, CII and Bull together under the Unidata umbrella, however, collapsed because the French government negotiated a separate deal with Honeywell US behind the backs of the German government! While hopes for the success of Unidata were still riding high, the Commission had pushed through in 1974 a Council Resolution backing a medium term programme on the application, development and production of data processing systems. The hope had been that this would mark the beginning of a major Community programme in computers and electronics. But with the failure of Unidata this initiative fizzled out, leaving nothing but a series of small and isolated Commission initiatives and illustrating well the problems of trying to create a coherent programme when the susceptabilities of national champions were at stake. (See Sharp and Shearman 1987 pp.46-47).

In the 1960s nuclear power was, of course, seen to be one of the most important areas of new technology, and the Commission's powers in this sector derived directly from the Euratom Treaty of 1958. Euratom's broad objectives were to encourage the creation and growth of the civil nuclear power industry in Europe through a programme of joint research and development. Four joint research centres were set up - at Karlsruhe (W Germany), Ispra (Italy), Geel (Belgium) and Petten (Netherlands) and areas of research covered included fast breeder reactors, high temperature gas reactors, nuclear ship propulsion, and nuclear applications to agriculture and medicine. Of these, the quest for a European reactor was potentially the most important but in practice the most neglected, with governments unable to agree a mutually acceptable financial framework within which to pursue the research, or even the research agenda to be pursued. In this respect developments were the casualty both of mistaken assumptions (about the future role of nuclear power which many in the 1960s saw as central to the future economic prosperity of the industialised world) and the nationalistic ambitions of the individual power plant manufacturers (who lobbied their respective governments accordingly). But the achievements of Euratom were not neglible. In spite of its failures in what should have been its main function, Euratom has assumed (and continues to do so) important regulatory functions in relation to civil nuclear energy and safeguards in the handling of radioactive materials; and its fast breeder reactor programme has survived, despite vicissitudes, into the 1980s, with the French model, Superphenix 1, the product of a fruitful and continuing collaboration between the French and Italian partners. (Sharp and Shearman (1987) pp.29-33).

Of all the new technologies of the 1960s and 1970s, the one success story of European collaboration - aerospace - owed nothing to the European Community and much to the determination of governments and their respective national champions to see collaboration through to success. Admittedly, both for aviation and space, economics rapidly ruled out the individual firm from acting alone unless heavily supported by government subsidy (which of course happened in the military sectors, but not in civil aviation), and even, as time progressed, inhibited individual governments from acting alone. But the lessons culled from, first Concorde, and then Airbus, are of the long, slow haul to collaboration; of the importance of the learning process in collaboration itself; and of the advantage in allowing industry, not governments, to dictate the scope for collaboration, allowing it to be market, not government, driven. (Hayward 1986).

The space story is also interesting, and illustrates another aspect of success - the need to pursue a coherent strategy with patience and determination over a long period of time, for with new technologies gestation periods can be very long. The precedents for European collaboration on space were not good. In the 1960s the European Launcher Development Organisation (ELDO) and the European Space Research Organisation (ESRO) both had their teething troubles and financial problems. But the merged European Space Agency (ESA) which developed in the 1970s drew in all European countries with a keen interest in the sector. As a narrow but functionally orientated collaborative framework, it has helped to produce a coherence of objective and purpose in the closely knit space community of policy makers, scientists, engineers and industrialists, and has ensured that, by the mid-1980s, Western Europe has the range of space capabilities sufficient to give it a degree of autonomy. Like Airbus Industrie, ESA is not without its problems, well illustrated by Britain's vacillations over membership. So far much of its success has derived from the pro-active leadership of the French; but with the shift from experimental to commercial, other partners may wish to have more of a say and consensus leadership may prove less coherent. There are also incipient problems over its military role. To date it has firmly eschewed any military connection (and has amongst its members a number of European neutrals) the ethos of its founding charter pledging it to a civilian and 'peaceful' role in space. (See Royal Institute of International Affairs 1987).

What lessons to be learned from the experience of the 1960s and 1970s? For the Community perhaps above all the limitations of Community action.

Arguments among governments, differences in national policies and the difficulties in establishing effective management formulae were all major constraints on effective Community action. But experience among national governments in promoting new technologies had not been happy either and there has been understandable cynicism about any bureaucracy's ability to "pick the winner" and fears that expensive mistakes at a national level would be translated into even more expensive mistakes at the supra-national level where accountability was weakened. But the lessons were not all negative. There had been some successes, and these suggested certain characteristics to be espoused. First was the need for flexibility - to recognise that not all programmes had to conform to a uniform Community pattern with participation from all Community countries, but needed to be tailored to circumstances, with scope for reappraisal and review. The 'variable geometry' that was to become an increasingly important theme of the 1980s, was already apparent. Secondly was the need for functional specificity. Programmes with limited but clear objectives were more likely to meet with success than grandiose programmes which promised the earth but could deliver nothing. Equally, it was crucial that the partners perceived sufficient benefit in the longer term to sustain their commitment through the short run and provide the incentive to reconcile major differences in outlook and interest. In this respect the Franco-German axis was crucial. Programmes which won support from these two partners were more likely to be successful. Thirdly, was the need to align the government and industrial role into one that was mutually reinforcing. There was little point in governments promoting programmes which were of no interest to the industrial community. In this respect programmes needed to be drawn up in line with the "grain of the market", not against it.

Section III - ESPRIT - a watershed in the development of Community programmes

In retrospect it is easy to see how these lessons were heeded in the developments of the 1980s and how they led to a whole new style of Community programme. At the time, it was a matter of groping forward in the dark, hoping that the new ideas and new institutions would achieve the desired change in attitudes. And as so often in history, it was a matter of the right person, delivering the right message at the right time.

The person was Vicomte Davignon who, in 1977, had taken over the Commission's industrial portfolio (DG III) determined to transform its image from one of supporting lame ducks (or condoning such support from national governments) to one of actively helping to create a new industrial structure for Europe. The problems which beset him in shipbuilding, steel and textiles were to prove less tractable than he hoped, but a number of factors played into his hands in relation to the promotion of new technologies. His interest in industrial R&D became evident at the same time as DG XII's forward-looking "Europe + 30" exercise reached fruition and the FAST (Forecasting and Assessment in Science and Technology) studies on the information society, biotechnology, and work and employment brought to light Europe's weakness in translating basic research into industrial activities.

By the early 1980s many industrialists began to express concern at Europe's relative decline in the IT sector. Within the industry as a whole, the European Community supplied a mere 40 per cent of its own market and 10 per cent of the world market. Whereas in 1975 the EC balance of payments in IT goods and services had been positive, by 1982 a large deficit had arisen. Japan meanwhile seemed intent on becoming the IT industry's second world leader. In the mid 1970s it had put in hand its VSLI (Very Large Scale Integration) Programme which had brought together its major electronics manufacturers and targetted major Japanese entry into the volume commodity chip manufacture with the 64K RAM chip. Japan's Fifth Generation computer programme, involving some $200m-$500m of government financial investment, was launched in October 1981. The USA, too, was far from complacent. Department of Defense collaborative programmes included work on VHSI (Very High Speed Integration), the STARS programme in software engineering and the Strategic Computing programme to develop supercomputers performing high-speed calculations.

Individually, of course, various of the European governments were supporting their IT industries. The French had run a series of Plans Calculs and Plans Compositants aimed at upgrading the computer and components sectors; the British had had a series of support schemes for microelectronics aimed at raising both productive capabilities and industrial awareness, and the Germans had had a succession of programmes aimed at upgrading performance and usage of computers and components.

The contrast between the relative failure of the separate European initiatives and the success of MITI's coordinated and collaborative VSLI programme was stark, and the lesson did not go unheeded. Under Davignon's guidance the Commission began to develop a more strategic approach to the information technology sector. The broad outline of a programme for microelectronic technology was produced in 1979-80 and agreed by the Council in November 1981. The Commission then took the unorthodox step of inviting representatives from the major companies to establish a working group to draw up the detailed programme which was to develop into ESPRIT, the European Strategic Programme for Research in Information Technology.

Davignon played a vital role in developing the ESPRIT programme. In his evidence to the 1985 House of Lords Select Committee on the European Communities, he outlined the three factors which had motivated his attempts.[5] In the first place, he had been struck by the 'very distinctive difference in performance' between the industries of USA, Japan and the EC. Secondly, he had felt that the time had come for Community competence to be upgraded to reflect more accurately the state-of-the-art; and, thirdly, he had been aware of the fact that no real incentive existed for cross-border collaboration. Any Community-level solution therefore needed a new approach to policy development. Up to that time the Commission had tended to work with research directors or their equivalents, and initiatives had come unstuck because they had been unable to carry those higher up the hierarchy. Davignon determined to liaise with only the very highest levels of company management, to define priorities with them and thus secure their commitment to the subsequent programme.

Over the period 1979-80 Davignon therefore invited the heads of Europe's leading electronics and IT companies to a series of Round Table discussions. The "Big Twelve", as they came to be known, comprised ICL, GEC and Plessey from Britain; AEG, Nixdorf and Siemens from Germany; Thomson, Bull and CGE from France; Olivetti and STET from Italy; and Philips from the Netherlands. Davignon received a more favourable response than the Commission had received from their lower-level counterparts in earlier years. A technical committee was established which set up a number of panels and workshops, and discussions continued for two years. Initially the thought was that they would establish a series of

Airbus-style joint companies to manufacture products within Europe. Such production activities, however, proved difficult to organize, whereas the concept of carrying out a major collaborative research programme seemed a more appropriate activity for organisation on a Community basis.[6] Discussion therefore began to focus on the pre-competitive end of collaborative research, a stance which from the Commission's viewpoint neatly avoided the issue of competition policy.[7]

The emergence of a Round Table consensus on the five areas of research where a European programme was deemed essential quite clearly reflected the high level of industrial commitment to the idea of collaboration. Discussions had been lengthy and detailed at a time when the possibility of any form of Community programme or funding was uncertain. But industry's willingness to commit itself was also the result of the intensified competition in information technology globally. In particular two events were seminal in changing attitudes - the prospective deregulation of AT&T, which would allow AT&T, long constrained by the US anti-trust authorities to operate only in the US, to move into European operations; and the settlement of the longstanding dispute between the US antitrust authorities and IBM which gave IBM carte-blanche to move into the telecommunications sector. Behind the scenes there was also the influence of the Gyllenhammer Group. This was an informal grouping of European manufacturers, ranging from Philips to Volvo and Pilkingtons, who keep a watching brief on infrastructure issues affecting Europe in general. Their acknowledgement of the inefficacy of promoting solely national policies played a part in the establishment of ESPRIT, as did the careful preparatory work of DG XII officials, while the newly formed alliance between the Commission and industry brought pressure to bear on national governments to recognise the logic of the Community position.

The first outline proposal for ESPRIT was produced in September 1980. The idea was to develop a European strategic programme based on the collaboration between the major European companies and their smaller counterparts, and universities and research institutes. By May 1982 these had been worked into a full proposal and the Commission's paper "Towards a European Strategic programme for Research and Development in Information Technology"[8] was put to the Council, and subsequently to the Versailles

European Summit in June 1982. The response was favourable and by December 1982 the Commission had the go-ahead for the first pilot phase costing 11.5 million ecus (£8.5m).

The pilot phase was a deliberate part of the Davignon strategy. Given the doubts he encountered from the participants in his Round Table, in particular over the capacity of the Commission to mount an effective programme which would not become bogged down in bureaucratic delays, his strategy was the "toe in the water" one - see how the pilot phase goes before you have to commit youself. A special task-force, many recruited from industry, was set up to handle applications and to cut through the Brussels red-tape. The call for proposals went out in February 1983, and contracts began to be signed in May that year. By September 38 projects had been launched which were later to be incorporated into the main part of the programme. Over 80 per cent of the first round of contracts went to the twelve Round Table companies (comprising, it has to be said, 70 per cent of the industry). The majority of projects involved participants from two to three member states. Of the total number of organizations associated with the pilot phase, 27 were located in Britain, 21 in Germany, 10 in the Netherlands, 8 in Belgium, 4 in France and 2 in Italy. Examples of the projects were: the Thomson-CGE partnership with Plessey and GEC in the development of an advanced interconnect for VLSI with the Universities of Newcastle, Southampton and Montpellier; the collaboration between Siemens, System Designers Ltd, CIT Alcatel and Philips on software production and maintenance management systems; and that between Olivetti and Nixdorf in broad-based office communication systems.[9]

Encouraged by the success of the pilot phase, the Commission rapidly pushed ahead with its full plans. Those comprised a 10-year programme (1984-1993) with an overall budget of 1.5 billion ecus (approx. £1 billion). The first five-year phase was to concentrate on the pre-competitive stage of developing the technology in three areas (microelectronics, advanced information processing and software technology) and two fields of application (office systems and computer integrated manufacturing). These plans were put to the Council in November 1983, but held up until February 1984 by British and German reservations over budgetary costs.

The first call for proposals under the full programme went out in March 1984 and met with a huge response. The 201 projects eventually selected for the programme's first phase involved 240 firms (57 per cent of these from firms with less than 500 employees) and 210 research institutions. Three-quarters of the research projects involved collaboration between firms and academic research units. By January 1987, a total of 1.36 billion ecus (approx. £900m) had been committed - almost the whole of what had originally been seen as a 10 year programme.

A crucial feature of ESPRIT has been the openness and commitment it has required of the firms linked into it. Project proposals have to be submitted in reply to open invitations. Each project must involve at least two independent industrial partners from separate member states. Costs are generally co-financed by the Community and industry on a 50/50 basis. Research results are shared between all the participants in any given project who are free to apply them commercially, and preferential access is then granted to other ESPRIT participants outside that project. These guarantees are the cornerstones of the whole ESPRIT process.

The Council decision adopting the full ESPRIT programme required its progress to be reviewed as soon as 60 per cent of the first phase budget had been committed. This point was reached by the end of 1984 and a three person review board was set up under Dr Pannenborg, ex-head of Philips, which reported in October 1985. By and large ESPRIT was given a clean bill of health. The Review panel concluded that the programme had been successfully established and was well on its way to meeting its original objectives. Certain changes in the selection procedure and evaluation of proposals were suggested, together with improvements in project management and additional channels of communication. For future development the Panel pointed to a continued emphasis on the pre-competitive aspect of research, a consolidation and restructuring of research areas and, finally, the addition of focussed demonstration projects with a large user involvement. (See European Commission 1985).

These suggestions have been incorporated in the second phase of the programme originally scheduled to start in 1987 but delayed by the problems over the agreement of the Framework Budget of which ESPRIT was a major part (see below). Phase II is roughly twice the size of ESPRIT I with a budget of 2 billion ecus (£1.4bn). The Review Board's suggestions for stream-lining the programme into three main areas of research - microelectronics, IT processing systems and application technologies - were accepted, as were the greater focus on what is called "demand driven" aspects of the programme, for example the greater emphasis on the ASIC (Application Specific Integrated Circuit) technology. The Review Board's call for demonstration projects is incorporated into what are called 'Technology Integration Projects' (TIPs), the aim of which is to pull the various strands of work together to show their usefulness to one another. For example, work on desk-top work-stations is being linked to the more theoretical work on parallel architectures, and if successful, this combination will considerably enhance the processing and presentation capabilities of the work-stations. (See European Commission 1986.) Although nominally pre-competitive research, a good part of ESPRIT II is in fact competitive research as those involved in the earlier research projects seek to stretch and develop some of the ideas exploited in that phase. The increasing popularity of ESPRIT is evident from the fact that the call to tender for the first phase of ESPRIT II was ten times oversubscribed.[10]

Section IV - Other Community Initiatives of the 1980s

A series of other Community programmes promoting new technologies have been launched in the wake of ESPRIT. Although differing substantially in subject matter and detail, they retain the ESPRIT characteristics of being functionally specific with clearly identified objectives, an open tendering system, and quick decision making processes (once the Framework Programme had been approved - the long wait over ESPRIT II was the hold-up in 1986-87 over agreement on the Framework Budget).

Besides ESPRIT, the most significant EC programme is the RACE (Research in Advanced Communications in Europe) programme. Unlike ESPRIT, which essentially looks to cooperation among firms and research institutions across the whole community, RACE has to operate through the national PTTs, ~~and~~ through them with national governments. The ESPRIT model has therefore not been appropriate and the Commission has instead had to approach the main "actors" (i.e. the PTTs) more indirectly via member governments (though having paved the way with ESPRIT help). RACE reflects a new consensus that the currently evolving narrowband Integrated Services Digital Network (ISDN) should gradually be replaced by an Integrated Broadband Communications Network (IBCN),[11] and the programme is designed to establish the technological base essential to the introduction of a Community-wide IBCN infrastructure and services. The programme's definition phase (1985-6) aimed at agreeing an IBCN reference model, identifying the relevant R&D design work, developing a consensus among PTTs on the functional and technoeconomic characteristics of the network itself, and evaluating the technical environment and the applications and/or services made possible by the new network.[12]

February 1986 saw the formal go-ahead for the first 'definition' phase of RACE. The programme, costing 40m ecus (£30m), involved 32 projects and 109 organisations ranging from equipment manufacturers, through broadcasters and telecom administrators, to university researchers. The R&D falls into four main areas - integrated circuits, optoelectronics, broadband switching and communications software - but the broad objectives of the programme embrace both design work on the system equipment and standards specification for what is called the Integrated Advanced Network. The second phase of RACE, approved as part of the Framework Budget for the five years 1987-92 with a budget of 550m ecus (£395m), likewise backs both equipment R&D and work on the formulation of common proposals for specifications and standards.[13]

Liberalisation of Community telecom markets somewhat undermines the concept of IBCN which looks to benefits derived from full interactive network provision, the idea being to provide the whole range of voice, video and data communications through a single cabled network. This may explain why, with the exception of the UK, the European PTT authorities have opted to keep the network provision as a public monopoly service rather than introducing competition into network provision (as the UK government has through Mercury). Technology is, however, rapidly also eroding the monopoly, with satellite and cellular radio both competing as transmission facilities. To date, business demand has shown a preference for the cabled network facilities which suffer much less from interference (especially important for data transmission). It is interesting, for example, that in the de-regulated environment of the US, business (and the telecom authorities) are currently both pushing the development of ISDN networks as precursors of IBCN networks.[14] The full cost of installing an IBCN network across the whole of the Community is likely to be in the region of 350 billion ecus (£245 billion) but spread over at least 10 years. But given that ordinary domestic consumers seem unlikely to want the full range of services potentially on offer, there is some dispute as to how extensive the network should be. Here the ambitions of the individual telecom authority determine the outcome. West Germany is committed to providing a broadband fibre optic cabled network to as many subscribers as possible, but France, under the Chirac government (1986-8), dropped its ambitious plan for interactive video in every home and now has more modest plans involving cabling only the main cities. In the UK, competition for the lucrative big business accounts between BT and Mercury has led to prime attention being given to business networks.[15]

It was against this background that the Commission launched its Green Paper on telecommunications in June 1987.[16] Building on experience in the first phase of RACE (and complementary to the proposals put forward for the second phase) the Green Paper called for a radical restructuring of the European marketplace in telecommunications, proposing considerably more competition in the equipment and service sectors while safeguarding the right to monopoly of network provision. In line with the complete liberalisation of the internal market by 1992, the Commission called for a series of actions ranging from the establishment of a European Telecommunications Standards Institute (ETSI) (which would be responsible for formulating all European standards) to the harmonisation of tariffs across Europe. The most disputed proposals have been those calling for the liberalisation of satellite services (for this erodes the PTTs' primary monopoly), and those advocating the harmonisation of tariffs, which, though the logical development from the unifying of the internal market, is nevertheless unthinkable for most PTTs at present. Overall, there has been a surprising degree of consensus that liberalisation of the equipment and peripherals markets has to come. We have yet to see whether the PTTs and the repective national governments will practise what they preach!

The significance of the Green Paper on telecommunications, however, lies in the evidence it provides that the Commission, not national governments, is now in the driving seat on telecommunications. While the European market remains fragmented by differing standards and regulations, Europe's commerce and industry remain at a disadvantage vis-a-vis their US and Japanese counterparts. The Commission recognises this: hence its push to simplify and standardise telecommunications services throughout the Community. How far it succeeds will be an indication of how far governments and business in the Community really are committed to following through the logic (and advantages) of the internal market.

Apart from work on IT and telecommunications, a number of other Community programmes deserve mention. One of the Commission's more recent initiatives has been the BRITE (Basic Research in Industrial Technologies for Europe) programme. Unlike ESPRIT and RACE this programme is not aimed at pushing forward new frontiers in mainstream areas of new technology, but at stimulating the use of new technologies in older industries. Nine major technological themes have been identified. These are the problems of reliability, wear and deterioration of materials and systems; laser technology and power metallurgy; joining techniques; new testing methods; computer-aided design and manufacturing; polymers, composites and other new materials; membrane science and technology; catalysis and particle technology; and new technologies applied to articles made from flexible materials.

BRITE follows the ESPRIT model in terms of its organisation and the emphasis on pre-competitive research. The rules and procedures for project selection, partner criteria and property rights are also similar. So too are the funding arrangements. The first phase (1985-8) has a project budget of 125m ecus (£87m), and the programme to date involves over 400 organizations across the Community. One quarter of these are small or medium sized business (SMEs), 21 per cent are research institutes and 19 per cent universities.[17]

The Community has also begun to develop a number of programmes which, like BRITE, cut across sector boundaries. Two examples are COMETT (Community in Education and Training for Technology), designed to foster cooperation between universities and industry for training in new technologies,[18] and SPRINT (Strategic Programme for Innovation and Technology Transfer) aimed at helping firms, particularly SMEs, identify and access specialist services across a range of skills and competence, the idea being that the organisation of contacts between people of different backgrounds and skills is a vital plank in the present day innovation process.[19] Compared to ESPRIT or RACE both programmes are modest in their funding, but are seen by many as important complements to the innovation process.

Finally it is worth mentioning another group of programmes which are helping to promote a very different group of new technologies - the biotechnology programmes. Again, in money terms these have been overshadowed by ESPRIT. The Framework Programme for the years 1987-92 sets the biotechnology budget at 150m ecus (£105m or approx £20m p.a.) compared with ESPRIT's budget of 2000m ecus (£1.4m). Nevertheless current expenditures represent a doubling of previous expenditures.

Back in the 1970s, biotechnology was, in fact, one of the first areas seen by the newly constituted DG XII (Research and Technology) as ripe for collaboration. Proposals aimed at advancing strengths in genetic engineering and enzymology were first put forward in 1974, but it was not until 1981 that the Commission was given the go-ahead to introduce its Biomolecular Engineering Programme (BEP). This ran for four years (1982-5) with total expenditures of only 15 million ecus (£12m), and it concentrated on supporting programmes that promoted post-doctoral training and exchange, and projects that linked academic research and industry. Its main thrust was towards the agri-food sector, not pharmaceuticals. (Narjes, 1986).

BEP was succeeded in 1986 by the more ambitious Biotechnology Action Programme (BAP), which has a budget of 50 million ecus (£36m) for five years (1986-90). Emphasis still rests on enzyme, genetic and protein engineering, but the programme now has two main thrusts: first, as before, to promote basic research and training; and, second, to promote what are termed 'contextual' developments, specifically 'biotic' collections (i.e. cell and gene banks) and 'bio-informatics' (data banks of gene sequences, etc.). BAP has been considerably oversubscribed with only about 15 per cent of applications being funded. Most of these involve university and research institutes' collaborations across Europe, but 40 per cent of those funded also involve some industrial participation. (Cantley, 1987). When

compared with the ESPRIT requirement of at least two industrial partners, this 40 per cent figure gives some indication of how biotechnology is still at a much earlier stage of development. Plans are currently being discussed for a successor to BAP to be called BRIDGE (Biotechnology Report for Innovation, Development and Growth in Europe) to run for the period 1990-94 in which an enhanced industrial role is seen, while a major initiative ECLAIR (European Collaborative Linkage of Agriculture and Industry through Research) aims to harness biotechnology for the conversion of agricultural ~~output~~ into useful industrial products and, vice versa, for the development of industrial products such as biodegradable plant protection products which use biotechnology to the benefit of agriculture. ECLAIR's expenditures are projected at 80m ecus (£56m) over the five year period 1988-93, and form a separate part of the Framework Programme from the biotechnology budget.
(European Commission, 1987).

On the biotechnology front, there is also the Concertation Unit for Biotechnology in Europe (CUBE), a development from the FAST programme, which had identified the Bio-Society as a vital area of future development and had recognized the need for some coordination at a European level. CUBE's main functions are to help the EC (both Commission and member governments) 'get its act together'. In this capacity it is linked both to the BAP and, via its Biotechnology steering group, to a range of activities across the Commission such as raw material supply, agriculture, intellectual property rights, regulatory development and patents. Though seemingly a minor activity, as with telecoms, the development of the regulatory environment will in the long run be a crucial factor in helping promote the competitiveness of European business in this sector. (European Commission, 1988).

Section V - The Framework Budget

The saga of the Framework Budget illustrates well the tensions between member states of the Community over, on the one hand, how much to spend in total on this element of the Community budget, and, on the other, how best to bring pressure to bear for fiscal rigour within the Community.

A good starting point is the Community Budget, set for the fiscal year 1987/88 at 36.6 billion ecus (£27bn), but overrunning this total by some 5 billion ecus, making a total of somehwat over 40 billion ecus (£29.2bn). Three quarters of that sum, approximately 30 billion ecus (£22bn) is devoted to supporting agriculture through the CAP, the remainder going to finance the competing demands of the social and regional funds, administration, Third World aid and, of course, science and technology.[20] Of this, the science and technology budget has been rather less than 0.8 billion ecus (£500m a year); even the new Framework Budget has only brought it up to just over 1.1 billion ecus (£800m) a year. In other words even at the higher rate of spending only two and a half per cent of the Community Budget is going on science and technology.

As indicated, ESPRIT introduced a different type of policy into the science and technology portfolio. Gone were the heavy-handed attempts at coordinating a Community mega-project as had been seen in the various Euratom projects. Instead, with ESPRIT the Commission was orchestrating a series of linked and complementary projects, whose common ground was that they all fell within identified IT priority areas: they all involved cross-border collaborations between firms and research institutions, with at least two firms among the partners, and the project proposal had come from below - from the partners - rather than being imposed from above. It was a formula which had immediately proved popular. As a result, as we have seen, the Commission immediately began introducing other programmes along similar lines.

Flushed with the success of ESPRIT and the support for such programmes expressed at the Fontainbleau Summit in the summer of 1984, DG III (Industry), DG XII (R&D) and Dg XIII (IT) began planning a major expansion. Commissioner Narjes (Industry), in the early spring of 1985 called for the establishment of a European Technological Community (ETC),[21] a plea that in part provoked the EUREKA initiative as a response from member states, primarily Britain and France, jealous of sovereignty and suspicious of the Community initiatives in this area. Narjes followed up his call for an ETC by suggesting that the budgets of all the Community's R&D projects be aggregated together into one 'framework' (the French use the word 'envelope') budget, and in 1986 put forward ambitious plans to triple the budget from its 1983-86 level of 3 billion ecus over 4 years (£2.1 bn or approximately £0.5 bn a year), 50 per cent of which went on energy, to a 10 billion ecus budget (£7 bn) over the 5 years 1987-92, with information technology, not energy, taking the lion's share.[22]

This 10 billion ecus bid was quickly scaled down to 7.7 billion ecus, (£5.3m) since it was clear it had little support from member states.[23] (On an annual basis, however, even the 10 billion ecus programme was still only 5 per cent of the Community's total budget). This figure was acceptable to the smaller countries (who have relatively smaller national research efforts) but opposed strongly by the governments of Britain and West Germany, both of whom regarded the proposals as representing fiscal profligacy (in that they more than doubled existing spending levels) and hoped that pressure on this budget would help bring other budget expenditures into line (i.e. to a degree they were prepared to trade an easier line on this budget with a tougher line on agriculture). From mid-1986 onwards, therefore, the Framework Budget proposals were caught up with the overall EC budget problems and Britain's wish, in particular, to see fiscal discipline injected into Community proposals, especially on the agricultural budget. As the row dragged on into 1987, a number of programmes which had been scheduled to come on-stream in early 1987, had to be postponed and the budget was successively trimmed to 6.8 billion (£4.7bn), then 5.7 billion (£4 bn), with the British demanding a cut of 3.6 billion (£2.5 bn). At this level it would have been very little above its 1983-86 level which would have made it difficult to mount any of the more ambitious programmes planned by the Commission.[24]

To the dismay of all but the British government, the disagreements continued through the spring of 1987 and were not finally settled until after the British general election in June that year. In the end the British settled for a budget of 5.6 billion ecus (£3.9 bn), a figure which had been mooted back in December 1986.[25] It is no wonder that the British stance was unpopular - nine valuable months could have been saved if they had settled then. The whole issue is a prime example of the continuing Gaullism of some member states - especially Britain - and their unwillingness to put Community before national interest. It is ironic in the light of their stance that the general election also brought a reassessment of domestic R&D policy by the British government and the recognition that Britain was getting good value for money from ESPRIT. Indeed, by early 1988, that same British government was cutting back its national IT programme and urging firms to participate in Community schemes![26]

Section VI

How effective have Community Programmes been in promoting the new technologies?

In the previous section the central issue was the size of the Community R&D budget. The key question, however, should not be how much is spent, but whether the money is being spent effectively. One of the main arguments used by the British government in their opposition to the Framework Programme was that a good part of the budget was not being used to promote worthwhile research. In particular they were critical of the sums being devoted to energy research (1.7 billion ecus (£1.2m) over the 5 years) where the Community now funded the previous Euratom programmes on fast breeder reactors and fusion and supported for the four research centres at Ispra, Karlsruhe, Petten and Geel. There were also criticisms of some of the other programmes for funding dubious 'collaborations' which had come together purely for the purposes of collecting EC subsidies.

Without undertaking detailed evaluations of each programme it is difficult to answer these criticisms. Britain was not alone in questioning the value of the energy research programmes and it is notable that even since the agreement on the Framework Budget, there have been substantial cutbacks at the joint research centres.[27] General opinion seems increasingly to doubt whether fast breeder reactors will ever prove an economic propostion while the viability of fusion power recedes continuously ever further into the future.

The other issue - whether the Community programmes were funding too many 'dubious' collaborations raises the issue of additionality. The concept of additionality is that programmes which offer a financial incentive to participation should aim to fund projects which are 'additional' - i.e. which would not have been undertaken if the incentive payments were not available. Ideally, of course, every project undertaken should be additional, but it is widely recognised that this is a counsel of perfection. Commission officials vet projects to screen out blatent cases of opportunism, but it is impossible to impose any rigorous set of criteria since, if asked, firms and/or research institutions will always claim they would not have gone ahead without the Community funding contributions. There are also other objectives - e.g. the development of Community-wide regulations; the promotion of cross-border collaborations - which these programmes promote. And although the notion of 'juste retour' (i.e. that countries should benefit according to contribution) does not apply in any precise form, Community officials also recognise that it is necessary to get a good spread of projects across the different member states and that for the high-tech projects it is not always easy to find partners in countries such as Greece or Portugal. But it is also important to develop the capabilities of these countries. Putting all these things together, therefore, officials have to accept that on any programme of the nature of ESPRIT, BRITE or BAP, there will be some 'deadweight' (projects which are dubiously funded). The hope is, however, that taking one thing with another the gains will exceed the losses. To keep check on this they maintain a regular programme of monitoring and evaluation.

It is in the broader context that the ESPRIT programme has really made its mark. There is not space here to detail the changes that have been taking place in the European electronics industry.[28] Suffice it to say that the latter half of the 1980s has witnessed a major realignment of strategies and capabilities around three main 'poles' of competence - Siemens, with its broad thrust of interests across the electronics sector from semiconductors through to telecommunications; Philips, the Netherlands based-firm multinational, which has switched from a geographically decentralised enterprise to a highly centralised operation which integrates up-stream capabilities (e.g. semiconductors, where it is linked with Siemens in the Mega-project) with its major operations in consumer electronics; and Thomson, the French firm which used to be the national champion par excellence, and now, via a route of acquisition and disposal, has Europe-wide (indeed world wide) interests in semi-conductors, consumer electronics and defence electronics. Likewise, in telecommunications, again three main 'poles' of competence are emerging in Europe - Siemens, Ericsson, the Swedish firm, and the French firm, CGE, which has not only taken over all Thomson's telecommunications interests but, via its purchase of IT's European interests, has become the second largest producer of telecommunications equipment in the world. In this sector what in effect we have seen in the last few years is the transformation of (some of) the former national champions into global firms competing and operating in global markets.

This is a remarkable transformation and it is worth asking what role has ESPRIT played in all this? Outwardly surprisingly little. Its Ecu 1.5bn (£1bn) budget spread over the 5 years 1984-89 was small beer compared with the investments being poured into the IT sectors by firms such as Siemens and Philips. Moreover, concentrating as it does on pre-competitive research, the emphasis is not so much on products that can be brought to market as on developing the tools and techniques to enable those products to be made. There are successes prime among which is the use of the Inmos transputer in the Parsys super computers, developed jointly with the French and the work on developing software standards for manufacturing and office automation systems has been invaluable to helping to open up these markets to European manufacturers.

Psychologically, however, ESPRIT has played a vital role in three important respects. First, ESPRIT has provided an important channel for cooperation. The need for cooperation should be set in the context of the early 1980s - the fragmented European industry gradually waking up to the realisation that it had allowed the US and then the Japanese multinationals to acquire a seemingly dominant technological lead; the increasingly high cost of R&D and initial set up costs in most high-tech sectors, combined with the uncertainties of the shortening product cycle; and the threat posed by the impending entry into the European arena by AT&T once deregulation opened the door to such entry. The tide of Japanese inward investment into consumer electronics illustrated how limited was the value of protection when capital was freely mobile. There was no alternative but to meet the threat head-on, which in turn meant rapidly acquiring technological capabilities not possessed in-house. Links with US and Japanese firms made sense technologically, but not strategically, since the objective was to decrease rather than to increase technological dependency. The figures speak for themselves. In 1983 the European Commission recorded 32 US-EC link-ups in firms in the IT sector, to six internal Community link-ups. By 1986, they were almost in balance; 49 US-EC link-ups to 46 internal community link-ups. Some would, of course, have taken place without the existence of ESPRIT; but there is little doubt in the minds of many participants that the existence of ESPRIT (and other programmes such as BRITE and EUREKA) have encouraged the European route.[29]

Secondly, ESPRIT has provided a mechanism for creating amongst top level decision takers in this industry convergent expectations about the future, and about the sort of measures needed to meet the competitive threat from the US and Japanese multinationals. The power of such convergence should not be underestimated for it becomes self-fulfilling - if all decision takers make investment decisions in the light of common expectations, production will expand as expected! The Japanese VSLI and Fifth Generation Programmes are based upon this principle; the young Turks from MITI effectively act as a mechanism which ensures that all firms act on a common set of expectations which then have a tendency to become self fulfilling. In the case of ESPRIT, Davignon's Round Table fulfilled this same function. For the first time, Europe's fragmented electronics industry confronted the threat of competition together. They discovered that there was among them 'convergent expectation' that competition would get tougher, that tariff or export constraint protective barriers were ineffective given the free mobility of capital, and that national champions protected by public purchasing ran the risk of being out of touch with market developments. Thus these major European companies came to recognise that to compete successfully even within Europe they needed to set their sights on global markets and global competitiveness. In this context, the national champion becomes irrelevant.

Thirdly, ESPRIT has created an important constituency pressing for the completion of the internal market and the abolition of all remaining internal barriers to trade, such as divergent standards and regulations. Once the major electronics firms had discarded their 'national champion' role, it was logical that they should begin to look to Europe as their 'home base' and to see in the divergent European standards, for example, on data transmission, as major hindrances to their effective operation in those markets. This has been reinforced by the very successful programmes within ESPRIT aimed at establishing Europe-wide standards for IT products. For example, it has created a set of software (called Communications Network for Manufacturing Applications (CNMA)) which allows different types of robots to work together within an automated factory, which in turn prevents the phenomenum that is seen so often with IT products, of tying customers into one particular range of equipment. A similar software has been developed for office systems (Office Document Architecture) which enables documents to be passed from one computer to another without loss of formatting etc. Recognising the advantages of these common standards has created companies such as Siemens, Bull and ICL into a constituency which recognises and promotes the virtues of the single European market.

Finally, ESPRIT has for many firms provided an important learning process in collaboration. The history of successful collaborations, such as Airbus Industrie, illustrates only too well the fact that collaboration is a slow process of building up mutual trust and respect among partners. Collaborations cannot be created and expected to be successful overnight. For many European firms there has been no experience of collaboration with other European firms, for European operations were frequently directed from a home base, whereas US and Japanese operations were conducted through local licensees who often became natural partners in any collaboration. For many such firms ESPRIT has been the first experience of collaboration with other European firms. The fact that over 1000 have applied this spring (1988) to participate in the second phase of the programme starting next year (January 1989) is testimony to the positive response the experience has provoked.

Looking back therefore over the history of the Community's efforts to promote new technologies, the 1980s has seen a sea change both in policies and in perceptions of success. The Community's rather heavy handed efforts at 'top down' coordination, typified by the ambitious, mega-projects of Euratom, have been replaced by a much lighter 'orchestration', where the Community seeks to encourage and channel innovation in certain directions, but where the drive for innovation is market led by the participants. The change coincided with a period of disillusion among European governments with the achievments, or more specifically non-achievements, of industrial policy and a desire to find policies which work with, rather than against, the grain of the market. And there were lessons also to be learned from the experience of the 1960s and 70s - from the failures of projects such as Unidata compared to the success of the (privately organised) Airbus Industrie. The timing, too, was propitious. The Euro-pessimism which pervaded European thinking in the early 1980s provided fertile ground upon which to seed thoughts of collaboration across European frontiers. Perhaps, above all, the experience has confirmed the prejudices of those who argue, as Jean Monnet did at the outset of the Community, that political will follows the establishment of mutual economic interest. Confronted by the double challenge to competitiveness from the US and Japan, the large and powerful companies who had been the 'national champions' of the 1970s, recognised the logic of the market place in espousing collaboration, but in so doing immediately created a strong constituency calling for closer and more complete integration of the European market place. 1992 is as much a product of the Community technology policies of the 1980s, as it is of the grand strategies of any European politician.

NOTES

1. The Action Committee for the United States of Europe was founded in October 1955, on the initiative of Jean Monnet, by the Socialist, Christian Democrat and Liberal Parties, and non-Communist trade unions of six EC countries: Belgium, France, West Germany, Italy, Luxembourg and the Netherlands.

2. For details of the Single European Act, see Bulletin of the European Communities, Supplement 2/86.

3. See the Colonna Report (European Commission 1970) for details.

4. In the mid-1970s all European countries were overtaken by excess capacity in their older industries - textiles, shipbuilding, steel, motor cars, even chemicals. Uncertain how far it represented purely a cyclical downturn after the oil crisis or a more far-reaching adjustment to the fundamental structure of the economy, nearly every government responded with subsidies and protection. The situation threatened to get out of hand with beggar-my-neighbour action which led to strong intervention by the Community in 1977-78 to limit state aids to shipbuilding, steel and textiles. Crisis cartels were established for steel and, briefly, man-made fibres, until DGIV ruled the latter out of order. An attempt to recreate a chemical cartel was also stamped on quickly. Overall, however, it meant that both national and Community authorities were pre-occupied by the problems of the old industries until the early 1980s.

5. See House of Lords Select Committee on the European Communities (1985) p.169.

6. Ibid p.35.

7. Under Articles 85 and 86, collaboration for the purposes of pre-competitive research is granted a block exempton. Collaboration at the development stage (competitive research) is however not allowed.

8. For a useful summary of Esprit Phase 1 documentation, see the European Commission's publication 'Official Documents on the Esprit Programme', COM (84) 608 (Brussels, Commission of the European Communities, 1984). For details on Phase 2, see COM (86) 269 final.

9. A full list of Esprit projects can be obtained from the Commission of the European Communities Directorate General for Information Technologies and Telecommunications, (DG XIII) rue de las Loi 200, B-1049 Brussels, Belgium.

10. See Financial Times 12.4.88 "Ministers give go-ahead to high technology research projects". William Dawkins.

11. ISDN allows voice, data, text and video to be carried. IBCN represents a higher capacity network which will evolve from and ultimately subsume the present services and network structures of, for example, ISDN, cable TV and mobile communications.

12. See Report of the Commission to the Council on R&D Requirements in Telecommunications Technologies as Contribution to the Preparation of the R&D Programme Race, COM (85)145 final.

13. See Financial Times. May 11 1988. Supplement on European Telecommunications. Especially artciles on pp. I & II.

14. See Financial Times October 19 1987. Supplement on World Telecommunications. "ISDN - New Trials Underway". p. XXVll

15. See reference in note 13 above.

16. [Get Green Paper Reference from Kevin Morgan if poss].

17. See Financial Times. Sept. 25 1987 "Commission Picks Research Projects" and European Commission. BRITE - Project Synopses. November 1986.

18. See Financial Times. December 12th 1985 "Brussels to Boost High Tech Links".

19. See Commission of the European Communities. European File The Sprint Programme. No. 18. November 1986..

20. Financial Times 19 February 1987. Tim Dickson "Delors tries to raise the necessary". As background. See the European Commissoin's European File pamphlet. "The European Community Budget" 17/86 November 1986.

21. Financial Times. June 25 1985 "Commission Outlines Plans for Technological Community.

22. Financial Times, March 7, 1986. "Commission Call to double R&D spending".

23. Financial Times. July 25 1986 "Commission Scales Down Research Plans".

24. Financial Times. April 9 1987 William Dawkins "Funding now puts EEC research at risk".

25. Financial Times. September 29 1987. "EC unblocks long-delayed research funds".

26. See the White Paper published in January 1988 "DTI - the department for Enterprise" Cm 278. HMSO. London.

27. Financial Times. April 12 1988. Ministers give go-ahead to High Tech projects" reports doubts on both the JET and other research centre projects. See also Financial Times for September 29 1986. "Brussels plan to cut cash for joint research centres.

28. For a description of these developments see Sharp (1989).

29. Financial Times. May 18 1988. William Dawkins. "Keeping Europe on the IT Map".

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INNOVATION IN ADVANCED MATERIALS:
TECHNOLOGICAL OPPORTUNITIES, INNOVATIVE PROCESSES, EFFECTS ON THE INDUSTRIAL STRUCTURE

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1. - Materials and Technological Development

The word "material" is used to indicate any matter ready to be transformed and integrated into a complex product. With a pragmatic approach, we can define the material as "the stuff things are made with".

From an analytical point of view, every material is defined by the following elements:

a. matter (chemical species)

b. energy (needed to extract and transform it)

c. information (technology).

The first and second elements have been combined in different ways throughout history, with an increasing importance of the energy requirements. In recent families of materials we can notice a shift toward a growing role of the information-technology element over the availability of raw materials and energy, i.e. a growing importance of countries and companies able to control the technology over the ones in which raw materials and low-cost energy are available.

According to their uses, we can distinguish between structural and functional materials.

* Structural materials are used for their physical-mechanical properties, and they define the shape and performance of industrial products. Since these materials have a direct relationship with the external environment, the use of structural materials is often regulated through norms and standards set by public bodies according to the public interest.

* Functional materials are used for their physical properties like electrical conductivity, potential for information storage and transmission and for the catalysis of chemical processes. These materials are usually strategic, even if only a small share of final product's value is related to the price of the material. The markets of functional materials are usually global markets, but the exchange of structural materials among the Japanese, American and European markets were very limited until a few decades ago.

Since structural and functional tasks are usually jointly performed by materials, the classifications of these are decided according to the main function. Some materials can be used either for their functional or for their structural features.

In the following sections we shall deal mainly with innovation processes in the area of structural materials, although many similarities exist between structural and functional materials.

Two major phenomena of new materials diffusion have taken place during the last century. In both cases traditional materials have been substituted, and new design opportunities have become available to industry.

First came the discovery, introduction and diffusion of aluminium. Aluminium was first produced in France in the 1860s using a chemical process. However, large scale production started only some decades later as a result of a new production process invented simultaneously by Herault and Hall in 1886.

Low-cost and high-power electric energy made available by the newly invented dynamo allowed a wide use of the new process. In the aluminium sector energy availability is the crucial factor compared with raw material and technology, and the technology-push side seems to be more important than the demand-pull one.

Synthetic materials started another major process of substitution among materials (Walsh _et al._, 1979; Walsh, 1984; Freeman 1982; Freeman _et al._, 1982). The development of synthetic materials in Germany resulted from a strong technology-push, that is, the research efforts of universities and chemical corporations (IG Farben, and later Hoechst, Bayer and Basf). Continuous cooperation and exchange of information between these actors are the main determinants of early German success in the area of synthetic materials.

The demand-pull side was also important, in terms of a need emerging from industry for low cost and light materials. Nationalist policies toward self-sufficiency, supporting import substitution of strategic materials, increased this pressure as well.

As usual, both technology-push and demand-pull factors have been active, but demand-pull was moulded by institutional intervention (Freeman, 1982). According to Walsh (1984, p. 231), "...the qualitative analysis of plastics suggests no discernible demand-pull, discovery-push or any other pattern to the invention of the major plastics".

In the following pages, we shall analyse the differences and similarities between past experience of diffusion of new (at that time) materials and the recent development of many families of Advanced Materials (AMs). Instead of stressing the existing differences among the processes of technological innovation in different families of materials, we shall analyse the common general features of these innovative processes. We will use this kind of approach because the analysis of some relevant case studies (Malaman, 1989; Amendola, 1988; BETA, 1987) revealed unexpected similarities among different technological trajectories. This allowed the horizontal assessment of such factors as sources and stimuli of innovation, relationships between suppliers and users, processes of generation and diffusion of AMs, and integration (either vertical or horizontal) phenomena.

2. - Advanced Materials as a Generic Technology

Two criteria can be used to distinguish advanced from traditional materials:

a. The predominance of technological factors (information) over raw materials control and energy availability is a feature common to all AMs families.

b. The growth rate of the world production, which is related to the development stage of each single material.

Both a. and b. are historical criteria, which evolved according to the scientific and technological progress of mankind.

The most important feature of AMs is that the value added is generated by technology, that is, by the subject controlling the technology itself. Raw materials used in AMs production are often low-cost, largely available and can be furnished by a number of suppliers; at the same time they allow for the substitution of strategic materials (1).

Materials can be classified according to their development stage as shown in Figure 1, though materials types are not homogeneous and there are remarkable differences among materials belonging to the same group. For instance, some engineering polymers and some highly standardized functional ceramics (packages and substrates for electronic applications) could be shifted to the right, and many families of composites (carbonium-carbonium, ceramic composites, metal matrix composites) could be shifted to the left.

Although no general agreement exists on the definition of "advanced", the main types of materials which can be classified as such according to the criteria above mentioned are listed in Table 1, which also shows their main properties and uses.

None of the single substitution processes currently under way among materials (or forecasted for the short-term) is likely to have the same quantitative effect as aluminium and synthetic materials diffusion did in the recent past.

However, by adding together the innovation and subsequent substitution processes in each advanced materials family, one can undoubtedly talk of a new "materials revolution". All industrial sectors are currently affected by the diffusion of new materials, and the competitiveness of relevant industries, today and even more in the future, will increasingly depend upon the capability of substituting existing materials.

The importance of AMs for the future of industrial development can hardly been understood by simply analysing the dimension of their markets today (Table 2). Forecasted trends (2) and the importance of the industrial sectors involved are much more significant.

Thirty-five out of the forty-one major European multinationals have developed activities in one or more families of AMs (van Tulder-Junne, 1988; Tab. 2.5). The group of companies involved in AMs activities (either as producers or as users) is larger than those active in other main core technologies, like chips, computers, robots, CAD, telecommunications, software development, biotechnology (3). Intense activities can be observed in the area of fine ceramics, composites and synthetic materials, where respectively, 16, 14 and 20 European multinationals are involved.

Other figures can be presented to stress the importance of AMs. About one third of the funding for the large nuclear, military and aerospace programmes is used to develop high-performance materials. More than two thousand Japanese researchers are active in new ceramics R&D activities, and about half of them are working on automotive applications; the Japan Fine Ceramic Association groups together 180 companies.

The complex "materials revolution" is the outcome of various processes: the diffusion of new materials, the joint utilization of materials that used to be considered incompatible, availability of new testing techniques, and growing opportunities to define tailor-made and non-homogeneous materials having locally specialized properties.

Information technology has a two-way relationship with the development of AMs. On one side it requires a continuous supply of new functional materials (optical fibres, gallium arsenide, etc.), and on the other it allows new research, testing, designing and information techniques for the development of every family of materials, either structural or functional.

3. - Scientific and Technological Competition: Patents Data Analysis

The patenting activity can be used to analyse the national performance of universities, research laboratories and firms, their evolution, and the effects of national policies aimed at promoting R&D activities in certain technological areas. Patents are representative of the output of R&D activities, while resources devoted to research on AMs are more difficult to measure because of the military secrecy covering most of the projects and the dispersion of funding for AMs activities in many academic disciplines and research projects and programmes which are not classified as new materials activities.

Patents are usually the result of applied research and development activities, but phenomena of forward patenting and cluster patenting are quite usual in chemical activities, to protect new formulations and compounds long time before the commercial exploitation of the discovery.

We selected the most important families of structural materials, advanced ceramics and polymeric matrix composites, using the INPADOC database (4). The "core technology", i. e. patents related to the chemical and physical features of the material, is largely covered, while our data are less representative of process and control technology.

Some remarks must be made before the analysis of the figures is presented (5):

* According to the tradition of studies about technological innovation, we analysed patent applications (6) in the US. In this country patents' validity is verified before the grant.

* As a consequence, the share of US patents is over-estimated, while the evolution of national shares during the twenty-years period and the comparison among European countries are not biased.

* The nationality has been decided according to the organization instead of the nationality of the scientists.

* Military-related R&D activities are probably under-estimated by measuring them throughout patents data.

The number of patent applications related to R&D activities on new ceramics and composites has doubled from the beginning (1968) to the end (1985) of the period.

At the end of the Sixties, the US supremacy in advanced ceramic technology generated more than 75% of the total number of patent applications in this area (Table 3), against less than 8% for Japan, and shares between 2 and 5% for the largest European countries. Similar values are shown in Table 4 for advanced composites, where Great Britain's and Switzerland's shares are the outcome of R&D activities of chemical and aerospace companies in the former case and of Ciba Geigy in the latter. British universities also played a relevant role, developing carbon fibres (from PAN precursor) and the family of ceramic materials called Syalons. Over 10% of patent activities on advanced ceramics at the beginning of the Seventies are British patents. This share is much higher than the Japanese one in these years.

While the number of US ceramic patents has been very stable during the 18-years period analysed, a slight increase was recorded in the area of advanced composites.

As a result of the dramatic increase of Japanese activities in this period, US and Japan shares in 1983-85 are very similar. This is the consequence of a progressive process of gap reduction, and a certain advantage (about 5%) still exists only in ceramic patents.

85% of the patents applications in both fields is from US and Japan at the end of the period, and the remaining 15% is the outcome of R&D activities in other countries. Only 1% (ceramics) and 3% (composites) of total patents are from the five small countries included in the sample.

Other important changes can be noticed during the period: the decrease of the British share is the outcome of a lower research effort in this country, and the consequence of the incapability to exploit R&D results in industrial activities. West Germany's leadership on the European scene is revealed by patent data. This is the result of chemical corporations' activities on polymeric matrixes and an increased R&D effort on new ceramics in universities, ceramic firms and chemical corporations, after the takeover of small-size advanced ceramic producers. Public support during the Seventies contributed to the German performance as well.

The results of scientific publications analysis (Malaman, 1989) are similar to the patterns described for patents, confirming the linkage between basic and applied research activities. At the end of the period, the Japanese share is greater than the US share for both the families of materials considered. Only in the next future we shall be able to verify the consequences of these intense basic research activities in Japan and to compare them with the commercial outcome of military-oriented US activities that are not revealed by patents and publications data.

4. - From Research to Production: General Features

Some characteristics of R&D activities and industrialization processes are common to the whole AMs area. We can summarize them as follows:

* Innovative activity is multi-disciplinary, needing simultaneous contributions from different branches of chemistry, physics, engineering. Researchers in these areas must cooperate to jointly define the material characteristics, process technology and non-destructive testing equipment and procedures.

* Production and use of AMs have a high scientific content. New materials development requires a permanent scientific input, and stable relationships among universities, public laboratories and firms (Onida-Malerba, 1988).

* Research projects are very long, with commercial results becoming usually available after 15 to 20 or more years from the beginning of basic research activities. Processes of early selection and shake out are frequent, even before productive activities have begun. Figure 2 shows the stages of development of a new material and the related costs evolution.

* Multi-disciplinary research, long periods of development, specialized and expensive equipment, and testing and certification requirements, contribute to raise the costs of R&D programmes on advanced materials. For instance, DuPont spent more than 500 million US$ to develop aramid fibres called Kevlar and Nomex used in aerospace applications and for production of high performance tyres (7). Uncertainty is also extremely high, both concerning technology outcome and market acceptance. High costs and uncertainty give a major role to large size companies, at least in the area of materials supply. Smaller firms can instead operate in

the shaping and final transformation activities. Responsibilities of R&D policy makers are also increased by the high cost and uncertainty of these programmes.

* Basic research has to be connected to engineering as soon as possible. Proof-of-production must be brought forward too, in order to improve processes and be able to have early estimates of large-scale production costs. Anticipated opening of thin (depending on the product) markets has thus frequently been the first comers' best strategy for the transition from small-scale (usually military) applications to large-scale production and use. These markets are usually very unlike the main future markets (8).

* Scientific and technological knowledge of both the supplier and the user of the material must be to a large extent generic rather than specific. A broad "materials culture" is needed, to allow for flexible specification of custom applications when needed. Basic research activities are requested even in the mature stage of the technology.

* Cooperative activities among materials producers, designers, equipment suppliers, and users are needed as well. As we shall see later, such permanent relationships induce some important changes of the industrial structure. Diversification and vertical integration processes can be originated by technological more than economical factors.

* On the user side, materials substitution processes require the development of new know-how and scrapping of existing equipment. Skills (Brady, 1988) and machinery must be changed, and costs of disinvestment (even if immaterial) are usually significant. These factors contribute to slowing down the substitution processes (9).

* Producers of existing materials usually react to the development of new materials by improving their R&D efforts, in order to enhance their products' performances. According to Freeman's typology of innovation strategies (Freeman, 1982, Ch. 8), this is a defensive strategy. The usual effect is to activate new research areas for other types of new materials, thus creating new technological trajectories. For instance, the development of aluminium-lithium alloys has been compelled by the diffusion of advanced composites in aerospace industry (10). Many research programmes on metals are currently aimed at facing competition from the diffusion of plastics, ceramics or composites.

* When the component made of the new material is part of a complex system, substitution is also slowed down by the need to re-design the overall product. For instance, large shifts in material mixes in the automotive or aeronautical industry are related to the launching of new models, which are in turn planned according to general market strategies.

5. - Sources and Stimuli of Technological Innovation

Technological breakthroughs which opened the technological trajectories of aluminium and many synthetic materials can easily be identified both on the product and the process side. One can also study the subsequent diffusion to different industries and products, and the incremental innovations that allowed these processes.

On the contrary, the common description of innovation as starting from technological breakthrough and followed by the exploitation of technological opportunities that have been created does not fit the case of AMs very well.

"New" materials are frequently materials that have actually been known for a long time, like many ceramic materials and the carbon fibres. Silicon nitride and silicon carbide were discovered a hundred years ago, but only recent developments have made it possible to use them as structural materials. Other AMs have been produced as a combination of existing materials, as in the case of composites, and it is really difficult to recognize a major innovation that allowed the joint use of these materials.

One can usually recognize only ex post the existence of a radical innovation as a sum of interrelated innovations in the following areas: chemical structure of the material, process technology, treatment of materials, design techniques, transforming and shaping processes, finishing and testing. If considered one by one, these innovations can be usually regarded as incremental.

The cumulative process of innovation which can be identified as a major innovation only on an ex post base can be described by picking from physics the concept of "percolation threshold" (seuil de percolation, according to Zuscovitch and Arrous, 1984). Only when critical points are reached (with reference to mass in physical phenomena and to knowledge in innovative activities), the aggregation of results from different research areas can be initiated.

Starting from distant and usually non-communicating technological trajectories, successive processes of aggregation of critical knowledge can lead to a radical innovation. Aggregation is possible only when adequate knowledge is reached on every single trajectory.

Radical innovation in AMs is therefore a complex system of innovations. Bottlenecks of any kind in one of the many original technological trajectories can delay or prevent the final radical innovation from occurring.

The main stimuli to the aggregation of innovations are originated by potential final users (von Hippel, 1980). This happened (and is going to happen in the near future) with aerospace, nuclear, alternative energy, military programmes and - partially - with information technology research. "Mission oriented" strategies (Ergas, 1986) have played a major role in promoting such aggregation processes.

As Kline and Rosenberg (1986, p. 287) pointed out, "Over the course of history thus far, it is moot whether science has depended more on technological processes and products than innovation has depended on science. Much of the pressure to create new materials is the result of direct feedback on problems encountered in creating such devices as steam turbines, jet engines, combustors, semiconductors, solar energy cells, and numerous other products".

This relationship between science and technology affects the one between technology-push and demand-pull factors. Demand side had an increasing role in the development of AMs.

This is not a traditional demand-pull effect as described by Schmookler (1966), who compared the turning points of capital goods sales or investment with the ones of patent data.

Demand-pull factors for AMs came from the performance requirements of great strategic programmes, usually accompanied by substantial injections of public funds. Existing technological trajectories have been modified and forced to communicate among them, whereas they would otherwise have been separate and non-communicating for a long time. Thus, interaction among different scientific disciplines, research organizations and industrial sectors has been forced by policy factors, with the effect of promoting the development of new trajectories.

The role of demand-pull factors (as described) is more relevant when the technological content of materials is higher and when contributions are needed from very distant existing technological trajectories. Demand-side factors have an almost exclusive role when no materials are available for specific functions which are needed in order to accomplish broad strategic projects.

Military and aerospace programmes played a major role in the development of AMs in the US and Europe, stressing the importance of performance requirements if compared to the control of production processes and costs (11).

The role of energy projects was much more important in Japan, starting from the Moonlight and Sunshine programmes during the '70s. As usual, a national strategy coordinated by the MITI was developed during the early '80s, with an active participation of all the most important corporations. A relevant share of resources has been devoted to the development of advanced ceramics and electronic materials, with a main objective to develop large-scale reliable productive processes and testing techniques.

While the shift from military to civil applications has proved to be difficult and not automatic in Europe and the US (even if quite effective in the aeronautical industry), the import to Japan and exploitation of existing basic knowledge and the emphasis on the process technology have given to this country a certain advantage over the competitors in the field of new ceramics. Japanese superiority is proven by the control of functional ceramics market, the initiation of the large-scale production of structural ceramic products (12) and their patenting activity.

National research programmes and national research laboratories for AMs development in large-scale applications have been set up in all industrial countries in the recent past, with Great Britain being the only exception (13).

Supply-push (or technology-push) factors become crucial during the diffusion process of new materials into large-scale production and/or the substitution of other materials. The role of materials producers is more relevant in this phase, also because of their control over the supply of know-how to potential users. Later, we shall come back and focus more extensively on the transition toward substitution phenomena in large scale production.

A statement receiving wide agreement in the debate on the relationship between technology-push and demand-pull is the following (14): technological factors tend to be relatively more important in early stages of development of an industry, while demand-pull are more important in the mature stage. As shown in the previous description, innovation in AMs is quite different, following sometimes a reverse cycle.

According to Kodama (1986a and 1986b; see also Pavitt et al., 1988) two types of innovations can be distinguished: technological breakthrough and technological fusion.

"Fusion type becomes possible by a concerted effort of several different industries involved. ... The industrial R&D activity outside its own principal product fields is directed toward creating technology fusion...the essence of technological fusion is its reciprocity. It is realized only when there is a two-way investment thus becoming reciprocal between two industries." (Kodama, 1986a, pp. 45-47). Thus, mechatronic and biotechnology are viewed as technological fusion processes.

As described, concerted efforts of several industries and crossed R&D activities among them (with the expense exceeding the development threshold) are general features in AMs innovative processes. Thus, Kodama's pattern can be usefully applied to describe the birth of new industries like fine ceramics and advanced composites. A different pattern is suggested by new metals producers behaviours, reacting with incremental innovations to the diffusion of new materials, without permanent phenomena of cooperation with the users or other industrial sectors.

The emergence of new ceramics during the early '80s can instead be explained as a fusion of ceramics producers with the chemical industry and both the ordinary and electrical machinery industry.

In a similar way, the composite material innovation could be seen as a technology fusion process among fibre industry, some metal companies (that developed carbon fibres production technology), textile industry (special weaving techniques), industrial chemical producers (which supply both the polymeric matrix and some fibres) and aerospace industry. The national patterns to build the advanced composites industry (that is, to develop and join the industries of fibres, matrixes, weaving, pre-pregs production, and final shaping and forming) have been quite different, involving sometimes different industries in different countries (BETA, 1987; De Banville- Verilhac, 1985).

Reciprocal investment and cooperative efforts among these industries have been very intensive, even if they can't be analysed with Kodama's statistical procedures (15).

6. - Cumulativity and Appropriability in Advanced Materials Technology

Innovative activity in the field of AMs is highly cumulative, i.e., incremental capabilities to develop further knowledge largely depend on already existing knowledge. This process benefits first-comers over followers.

The above mentioned features of AMs technology help one to understand the high cumulativity of knowledge in this area.

First, given the length and multi-disciplinary nature of the development process, experience based on trial-and-error procedures plays a major role, and theoretical understanding of material behaviour is usually an ex post acquisition. Learning by doing, learning by producing and learning by using are thus major sources of innovation.

Second, the systemic nature of innovation in AMs spurs the technological leader in organizing long-lasting cooperative relationships (formal and informal) both with the academic world and with the main potential users. Major technological improvements are the consequences of cooperative activities between leading material suppliers, equipment producers and the most important users (16). Personal contacts and formal cooperative procedures are usually established between these actors, leading to cumulative interactive processes, with experience being shared among partners. Cooperative agreements also tend to create a barrier against entry of new potential producers in the sector.

Cumulativity is very high in production processes as well. Because of this, producers are pushed toward early entry into niche markets in order to accumulate knowledge and test the economic and technological feasibility of large-scale production processes.

Advantages of first-comers are often increased through market pre-emption strategies, leaving no room to potential new comers. Sometimes also, excess production capability is created either because of over-estimation of market demand or as a consequence of policy decision to support national suppliers of materials which can be regarded as strategic to some industries. Market pre-emption strategies have been deliberately used in functional ceramics, carbon fibres and aramid fibres.

Testing and certification procedures in aeronautical industry also protect first-comers, by artificially raising the entrance threshold to the market.

All these factors defend first-comers on the market side. We must also take into account, on the technology side, the high degree of appropriability of R&D results in this area, i.e. the high capability to appropriate returns generated by innovation. Although R&D activities are very expensive and long-term, the technological leader has effective instruments to prevent imitation. Industrial secrets and patents are highly effective, but this is true more on the material production side than in the transforming processes.

As a general rule, product and process patents are more effective in chemical and mechanical fields than in microelectronic and information technology (Levin et al., 1984), and the chemical component of advanced material technology is easier to protect from imitation. Propensity to patenting in AMs production is thus high, and strategies of "cluster patenting" are often used to protect broad technological areas.

Interviews made in research laboratories and companies working on AMs have confirmed the high priority given to patent protection if compared to other technological areas (biotechnology, opto-electronics, lasers).

Some example of effective patent protection strategies are:

* DuPont (US) protecting aramid fibres production by using process patents (see note 7).

* Lucas-Cookson (UK) patents on ceramic called "Syalons" being sold to many foreign producers, even though the British industry has not been able to fully exploit the good results of national research activities undertaken during the '70s.

* Max Planck Institute für Metallforschung of Stuttgart (FRG) has licensed some of its patents on silicon nitride to NGK (Japan).

* Patents and secrecy are so effective in carbon fibres production that some French companies (Pechiney and Elf) had to sign a joint-venture agreement with the Japanese company Toray, despite a decade of internal research heavily sponsored by the national aerospace industry and helped by public funds allocation.

If patent protection is highly effective in preventing imitations for materials producers, users are mainly protected by secrecy strategies about processes and designing technologies.

As we described earlier, first-comers are highly protected in the supply of AMs, both because of technological factors and because of the market structure. As a consequence, the shake out processes following the creation of excess productive capability do not usually push the first-comers out of the market, also because they are able to imitate incremental innovations originated by the followers. The first-comer's general culture and experience about the materials and the processes allows such imitation phenomena, which was observed during the development of synthetic materials as well (Freeman, 1982, p. 60).

The recent history of AMs shows a few cases of late comers (or followers) succeeding. Some Japanese companies are exceptions to the rule, since they achieved market leadership even without being early technological leaders. The development of large-scale production processes has been their main strategy both in functional ceramics and in carbon fibres production.

The market of functional ceramics (substrates and packages for electronics) has been dominated by the Japanese company Kyocera (former Kyoto Ceramics) since the '70s, despite the fact that preconditions for US supremacy seemed to exist during the '60s (Clark and Rothman, 1986). Close attention to customer needs, high reliability of products, investment in high-volume production and an aggressive service strategy have all contributed to Kyocera's success.

The main key to success has been a new kind of manufacturing process, an automated short-cycle process based on equipment designed and built inside the company (17). On-time deliveries, high product quality and appropriate price strategies were direct consequences of Kyocera's new process technology. Its world market share is today over 60%.

7. - Suppliers and Users: Toward Large-Scale Production

New product design has traditionally started with existing materials, whose properties and behaviour were well-known by users. The evolution of materials technology was an important constraint to the evolution of final products in history. This relationship between material and product has dramatically changed during the last century, especially with respect to structural materials.

The main evolutionary stages in the relationship between material and product (i.e., between supplier and user) can be summarized as follows.

a. The final product is designed according to features of existing materials. These materials and usually the processing techniques are considered as an exogenous variable by designer. The technological level of the final products is imposed by the performance of the material. Thus, the activities of material supply industry have a strategic general role, by acting as a limit to the user industries.

Linkages between suppliers and users are not very strict. There is usually limited feedback between users and suppliers and no cooperative research efforts.

b. The specialized material is designed according to the desired features of the final product. Therefore, the material becomes an endogenous variable and can be modified according to the users' needs. Composites are typical made-to-measure materials, since it is possible to join different materials in many different combinations, and to modify their properties even locally. Other groups of materials can be tailor-made also, especially if high performance features are needed to fulfil requirements from strategic programmes in the energy, aerospace or military fields.

The transition from model a. has progressed to model b. for all the types of high-tech materials, even if final stages are quite different.

c. The material (matter), process, production method, design, final product features, and testing techniques are jointly selected and optimized. This is the final stage in the evolution of material-product relationship, usually substituting for model b. when some degrees of freedom are available in the characteristics of the final product.

A maximum level of cooperation between the supplier and user and an interdisciplinary approach are necessary in model c. to create the final product. Phenomena of vertical integration (both downstream and upstream) are promoted because of the strict interdependence among different phases of the productive process.

We can notice a process of diffusion from small-scale to large-scale applications in every group of advanced materials. The final stage of technological development of a material can be very different, depending on the diffusion opportunities of the specific material.

Among the possible uses of a new material, we can distinguish non-competitive from competitive ones (the dark areas in Figure 3). This distinction is not fixed, but it changes according to the stage of technological development of the material. The non-competitive applications are those which allow new uses and new performance, instead of substituting for existing materials in existing uses.

High-tech materials are usually developed with the aim of contributing to the success of otherwise impossible important programmes. They are not introduced to substitute other materials, but to exploit their complementary features if used with existing materials (18). Thus, in the optimization process of the price-performance relationship, the importance of the performance side is stressed. The price factor can even be unimportant, as seen in some aerospace and military projects for many families of composites, and in space, nuclear and military programmes for ceramics.

During the transition from non-competitive to competitive uses of materials, the attention shifts from the performance side to the price-performance relationship. The price factor becomes more and more important as the new material is developed for large-scale productions.

Substitution processes take place only if there is a marked superiority of the new material price-performance characteristics. If the superiority of the new material is in doubt, the existing skills, equipment and routines of the firm will favour traditional solutions.

Lowering the cost of the material is necessary in order to switch from non-competitive to large-scale uses. A vicious circle can be generated between potential users, who are waiting for a reduction of prices, and production costs, since these costs can only be reduced by increasing the scale of production. Process technology in the production both of the material and the final product is a key factor in reducing production costs.

The global cost that should be considered in comparing old and new materials is more than the cost of the material itself.

In the time unit, the global cost (C) can be defined as follows:

$$C = (CMa + CDe + CPr + CTe) / t + CFu + CMn$$

where: CMa = material cost

CDe = designing cost

CPr = production cost (including the share of investment goods and personnel training, the cost of labour force ant the cost of rejects)

CTe = testing cost

CFu = functioning cost in the time unit

CMn = maintenance cost in the time unit

and t is the forecasted life length of the product.

New materials usually have a higher cost, and the costs of designing and testing them help to defend the use of existing materials. Other components of cost must balance these unfavourable factors to promote substitution processes.

For example, the higher price of advanced composites and the extra cost of designing and testing make them more expensive than aluminium alloys (19). The growth of the use of composites in aerospace industry is mainly the consequence of greater degrees of freedom available in designing aerospace parts, and the consequent reduction of the number of components and the time needed for production (20), maintenance costs and fuel consumption. The fuel saving is about 3,200 litres for each kilogram of weight reduction in the structural components of a plane, assuming an average life of 15 years. The weight reduction realized from the use of composite components substituted for aluminium ones is usually about 30%.

8. - Toward a Multi-Material Supply Sector

Competition among materials is becoming more and more intense. Users have to choose the best material for specific applications according to performance requirements, costs, available productive processes, production timing, and maintenance needs.

A permanent dominant material does not exist for a given product. French reports (CPE, 1983; Cohendet, 1985) have described these continuous processes of substitution, potential use of different materials, and complementarity among materials by using the concept of "hyperchoix des materiaux".

The continuous competition among materials and the uncertainty about their diffusion rates and future technological scenarios have pushed many material suppliers toward a diversification process. These companies have taken a position in neighbouring areas to exploit their existing technological capabilities, to avoid the erosion of their market share and to reduce future risk.

All the chemical groups and most of the iron and steel companies have enlarged (or are going to enlarge) their product portfolio by entering the advanced materials market, by adopting strategies of developing materials within their firms, or by acquiring expertise through taking over existing companies.

Table 5 shows the main diversification and integration processes emerging in new material businesses. The first five columns represent the diversification processes, which build multi-material groups. The following four columns show upstream vertical integration processes.

Traditional ceramic producers are the major group of companies involved in fine ceramics. Diversification processes of chemical groups and upstream integration of electrical, electronic and machinery producers can also be noted. Engineering plastics are a natural focus for the new activities of the chemical industry, while the deep crisis of the fibre producing industry pushed some of these companies in a similar direction. Technological factors are the main constraints to enter the new metals and composite materials market. The former area has been occupied mainly by iron and steel and non-ferrous metals producers, the latter by chemical and fibre producers.

Multi-material groups (for instance Pechiney, Nippon Steel, Nippon Kokan, all the chemical corporations) are emerging to be a continuous feature of the material supply industry, in order to exploit complementary technology and services to customers. Organizational troubles for these firms are expected in the near future, because they are entering directly competitive markets and they will face the problem to manage businesses that are in competition one against the other.

9. - Summary and conclusions

A rapid process of substitution among materials is working in industry, as a consequence of the discovery of new families of materials that are initially used in high-tech sectors and (sometimes) spread to other industries even in the traditional sectors. These materials are mainly ceramics, engineering polymers, composite materials, superconductive materials, and metallic super-alloys.

The "material revolution" is not the result of the discovery of a single family of materials, as instead was during the diffusion of synthetic materials or aluminium. The new technological paradigm of advanced (or "new", or "high performance") materials is the result of scientific and technological research in many different areas, such as chemistry, physics, engineering. The simple "discovery of the material" is just the first step, and new materials are often as a matter of fact very old materials if defined according to the date of discovering.

The radical innovation is the final result, not the original material. Only ex-post you can recognize radical innovations and new technological trajectories. The final innovation is not the material, but the system of the material, the transformation process and the final product.

Traditionally, new products were designed by assuming as a datum the characters of existing materials. The new approach is to project the material by considering the final product and its necessary performance as exogenous. The incoming approach is the joint definition of the material, the machinery, the design techniques, the transformation process, the non-destructive controls, and the final product. This will be the only way to get the best performance at the lower price, and makes necessary a permanent cooperation among scientific disciplines and industrial branches.

In other technological areas (which have been more deeply studied till now) you can see the creation of a huge technological opportunity that is available and is waiting to be used after technological and economical processes of selection and adaptation needing incremental innovations. In the advanced materials field, this process seems to be reversed, and a reverse relationship exists between technology-push and demand-pull factors as well.

Cumulativity of innovation activities in the area of new materials is very high, because experience has a very great importance and is incorporated by men's and firms' routines. Appropriability of R&D results is very high, both because patent protection is effective in the chemical productions and because the multi-disciplinary features of the technology and the high cost and length of research programmes make it difficult the task of the followers. Market pre-emption strategies are used by first-comers, and the rapid creation of productive capability excess is very common. This is also the result of the slowness of substitution processes, because final users must change their culture, their equipments, their personnel.

As a consequence of all these factors, the first-comer has a great advantage (both technological and on the market) on followers.

On the supply-side of the new materials industry, multi-materials groups have emerged. Complementary technologies and services to customers are exploited by these groups, with the aim to reduce risk by offering to customers the opportunity to choose among alternative materials competing one against the other.

NOTES

(1) - Many of the strategic materials substituted with AMs are today supplied by developing countries. New materials' diffusion is modifying the trade patterns among industrial countries and shifting shares of export from developing to industrial nations. At the moment, existing classifications of industrial production and trade don't allow the analysis of AMs' international exchanges.

(2) - See Malaman (1989) for details about present and forecasted estimates of advanced ceramics and composites markets, and BETA (1987) for other materials.

(3) - This is not a comparison of the strategic role of different core technologies for the European multinationals, but a useful indication of the importance of AMs in the present and future strategies of these groups.

(4) - Patents data on advanced ceramics are selected by using the International Patent Classification at the maximum level of disaggregation; patents data on composites by using key-words in the title. The INPADOC database has been used to this purpose. Dr. Francesco Collenza (ENEA) cooperated in the search. Details can be found in Malaman (1989).

(5) - See also the observations about the use of patent statistics in Pavitt (1985).

(6) - The use of patents applications instead of grants enables us to analyse the national performance until 1985, even if some of these patents will never be granted after the Patent Office examination. A comparison between applications and grants during the Seventies has shown very similar patterns.

(7) - Akzo needed about half of DuPont's investment to develop (or imitate) aramid fibres (Twaron) similar to Kevlar and Nomex. After a twelve-year litigation for possible patent infringements, an agreement was signed in 1988.

(8) - After military, space and nuclear applications, structural ceramics have been used - mainly by Japanese companies - to produce scissors, knives, components for industrial machineries and tools, car brakes and spark plugs. After the initial aerospace applications, advanced composites have been widely used to produce sport equipments. Large scale production helped the rapid slowing down of composites prices during the past ten years.

(9) - Aeronautical applications for civil aircraft are slowed down by testing and certification procedures, which reduce the advantage of using new materials.

(10) - By using aluminium-lithium alloys, the aircraft producers will be able to avoid the substitution of existing equipment and the changing of skills and design procedures.

(11) - See Malaman (1988b) for a description of public policies supporting AMs development in US, Japan, and the main European countries.

(12) - NGK started in 1987 the production of 10000 rotors for turbo car engines every month, using a patent of the Max Planck Institute of Stuttgart and developing in-house productive processes. Many other high-tech structural ceramic products have been launched during the past two years on the Japanese market. Their diffusion was made easier by the "ceramic-fever" (or fashion) existing in that country.

(13) - The most important research programmes started in the recent past are: Programme Mobilizateur Matériaux and Programme Interdisciplinaire de Recherche sur les Matériaux (PIRMAT) in France, Materialforschung in West Germany, Progetto Finalizzato Materiali Avanzati in Italy, an important part of the Basic Technology for Future Industry (Jisedai) programme in Japan. National research centres for new materials are to be settled at Lyon, Nagoya, Stuttgart, Berkeley, and other places.

(14) - See Freeman et al. (1982).

(15) - In addition to the number of industries involved in this process and the complex relationships among them, the main reason is the international specialization existing in the composite industry, where Japanese producers are leading suppliers of carbon fibres, US and European companies supply matrixes and aramid fibres, and pre-preg producers are usually close to the final users. Thus, only an international analysis could show phenomena of technological fusion among these actors.

(16) - For instance, the design and production of the Citroen BX fiberglass composite back bonnet is the outcome of the cooperation among a fibres supplier (Vetrotex), a chemical group (Rhône Poulenc), an equipment supplier (Billion), and the car producer (Peugeot-Citroen). Similar processes have taken place in the aerospace industry, sometimes through the creation of consortia or joint ventures.

(17) - The main difference between Kyocera and American producers (American Lava - 3M, IBM, RCA, Metceram, Coors, Frenchtown and others) was the former's high level of specialization, started since its foundation in the late '50s. Ceramic packages were only a secondary product for most American producers, not receiving as such high investments in R&D aimed at (and required for) developing efficient large-scale productive processes.

(18) - The process is described in BETA (1987), p. 103.

(19) - Aluminium-lithium alloys are up to five times more expensive than traditional aluminium alloys for aerospace applications. Composite materials prices are ten to twenty times higher than aluminium alloys prices.

(20) - For instance, the Airbus composite fin is built with 96 components only, against over two thousand of existing metal models. Composite car bonnets (Citroen BX and AX, Fiat Uno Turbo and Tipo) are built by joining 2 to 5 parts instead of 20 to 30.

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Table 1

MAJOR TYPES OF ADVANCED MATERIALS

	TYPE	PROPERTIES	MAIN USES
New ceramics	Electroceramics	semiconductive, magnetic, insulative, piezoelectric	IC packages, IC boards, condensers
	Engineering ceramics	toughness, heat and abrasion resistance	cutting and grinding tools, gas turbines, vehicle engines
	Bioceramics	bio-compatibility, toughness, resistance to corrosion	artificial teeth, bones, joints
	Superconductive materials	reduced electrical resistance	linear-drive trains, various electrical uses
High performance polymers	Engineering plastics	high strength, heat resistance, fire resistance	car parts, electric and electronic components
	High-performance filter membranes	filter out without application of heat energy	artificial kidneys, desalinization systems
New metals	Amorphous alloys	toughness, ferromegnetism, resistance to corrosion	transformer cores
	Memory alloys	resume their original shape if subjected to a certain temperature	pipe fitting, electronics components
	Hydrogen-storing alloys	ability to store hydrogen	hydrogen storage tanks, refrigerating units, engines
Advanced composites	Polymeric matrix	high strength, lightness, flexibility, resistance	aerospace structures, sports equipments, industrial components
	Other matrixes	high strength, heat resistance, resistance to corrosion	space vehicles, transportation

Table 2

WORLD MARKET FOR NEW MATERIALS (*)

	1987 market (million US$)	average annual growth rate 1987-95 (volume)
Technical thermoplastics	9000	8
Technical thermosets	13000	6
Non-ferrous metals	11000	8
Advanced Composites	10000	10
Advanced ceramics	6000	15
Materials for electronics	12000	9
New steel products	40000	12
TOTAL	101000	10

(*) Superconductive materials are not included.

Table 3

U.S. PATENT APPLICATIONS 1968-85 - ADVANCED CERAMICS - SHARES ON TOTAL

years	USA	JAP	RFT	FRA	GB	ITA	CAN	SWE	CH	NL
1968-70	76.5	7.8	3.9	2.4	5.1	.0	.0	.4	.4	3.5
1971-73	72.4	2.4	6.9	2.4	11.4	.6	.3	.6	.6	2.4
1974-76	63.5	19.6	4.6	2.9	6.0	.0	.0	1.7	.3	1.4
1977-79	57.3	27.9	5.6	2.5	3.6	.3	.3	1.0	1.3	.3
1980-82	47.8	34.1	8.0	5.7	~~2.5~~	.2	.2	.2	.2	1.0
1983-85	45.4	40.6	6.3	2.8	3.7	.2	.4	.2	.2	.0
TOTAL	58.6	24.2	6.0	3.2	5.2	.2	.2	.7	.5	1.2

Table 4

U.S. PATENT APPLICATIONS 1968-85 - ADVANCED COMPOSITES - SHARES ON TOTAL

years	USA	JAP	RFT	FRA	GB	ITA	CAN	SWE	CH	NL
1968-70	67.8	8.9	4.8	1.8	9.5	1.2	.6	.6	4.8	.0
1971-73	68.7	15.9	4.0	4.0	5.1	.0	.0	.6	1.1	.6
1974-76	60.8	20.3	6.3	3.8	7.0	.0	.0	.6	.6	.6
1977-79	53.2	25.4	7.0	3.5	3.9	1.7	.9	.4	3.9	.0
1980-82	51.4	27.7	7.8	4.1	4.5	.0	.7	1.5	2.2	.0
1983-85	43.1	42.1	6.6	3.6	1.5	.3	.6	.3	1.2	.6
TOTAL	55.1	26.1	6.3	3.5	4.7	.5	.5	.7	2.3	.3

Table 5

CORPORATIONS ENTERING THE NEW MATERIALS MARKET

INDUSTRY NEW MATERIALS	Iron and steel	Non-ferrous metals	Chemicals	Fibers	Traditional ceramics	Electrical and electronics	Machinery	Motor vehicles	Heavy industry and engineering	Other	Total
Fine ceramics	8	7	15	2	34	13	17	3	4	1	104
Engineering plastics	0	0	13	5	2	0	0	0	0	0	20
New metals	11	23	7	2	1	8	6	2	3	4	67
Composite materials	3	0	5	5	2	0	0	1	3	3	22
Total	22	30	40	14	39	21	23	6	10	8	213

Source: Fuji Bank Industries and Corporate Research Division, 1986.

Figure I

DEVELOPMENT STAGES OF DIFFERENT ADVANCED MATERIALS TYPES

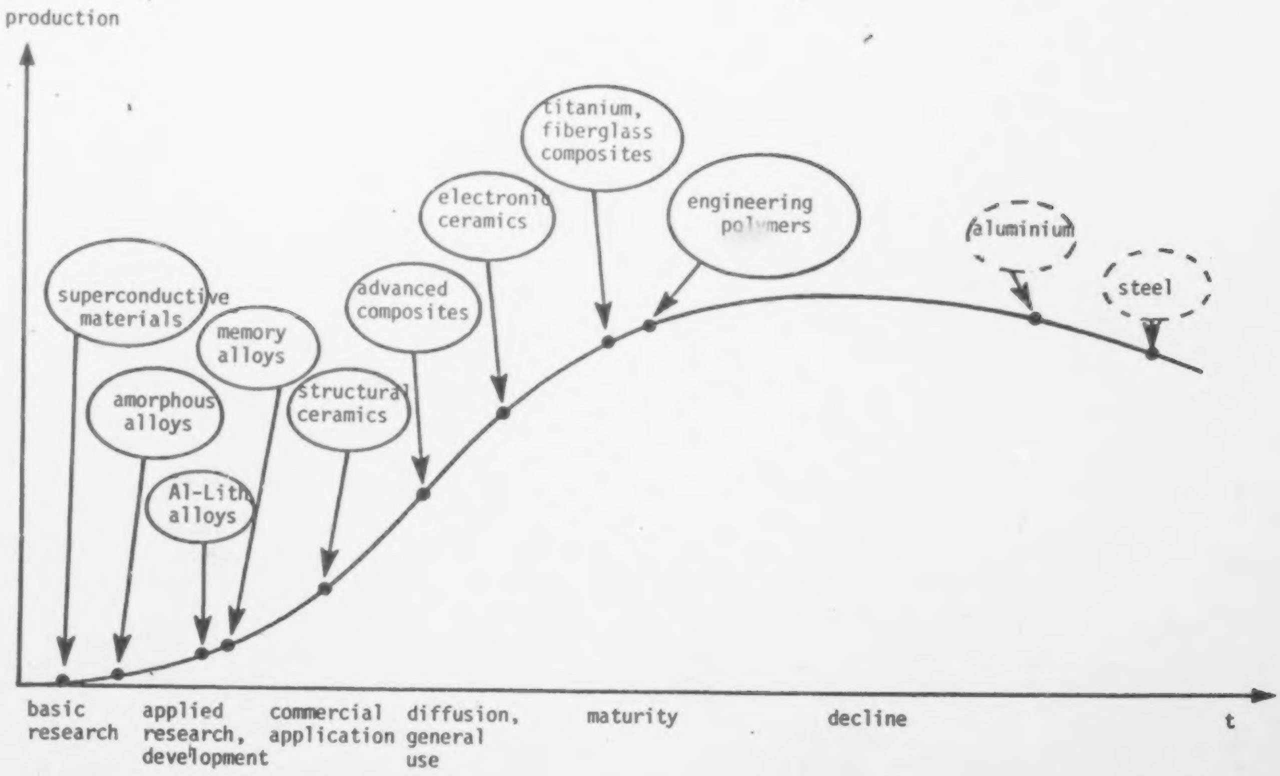
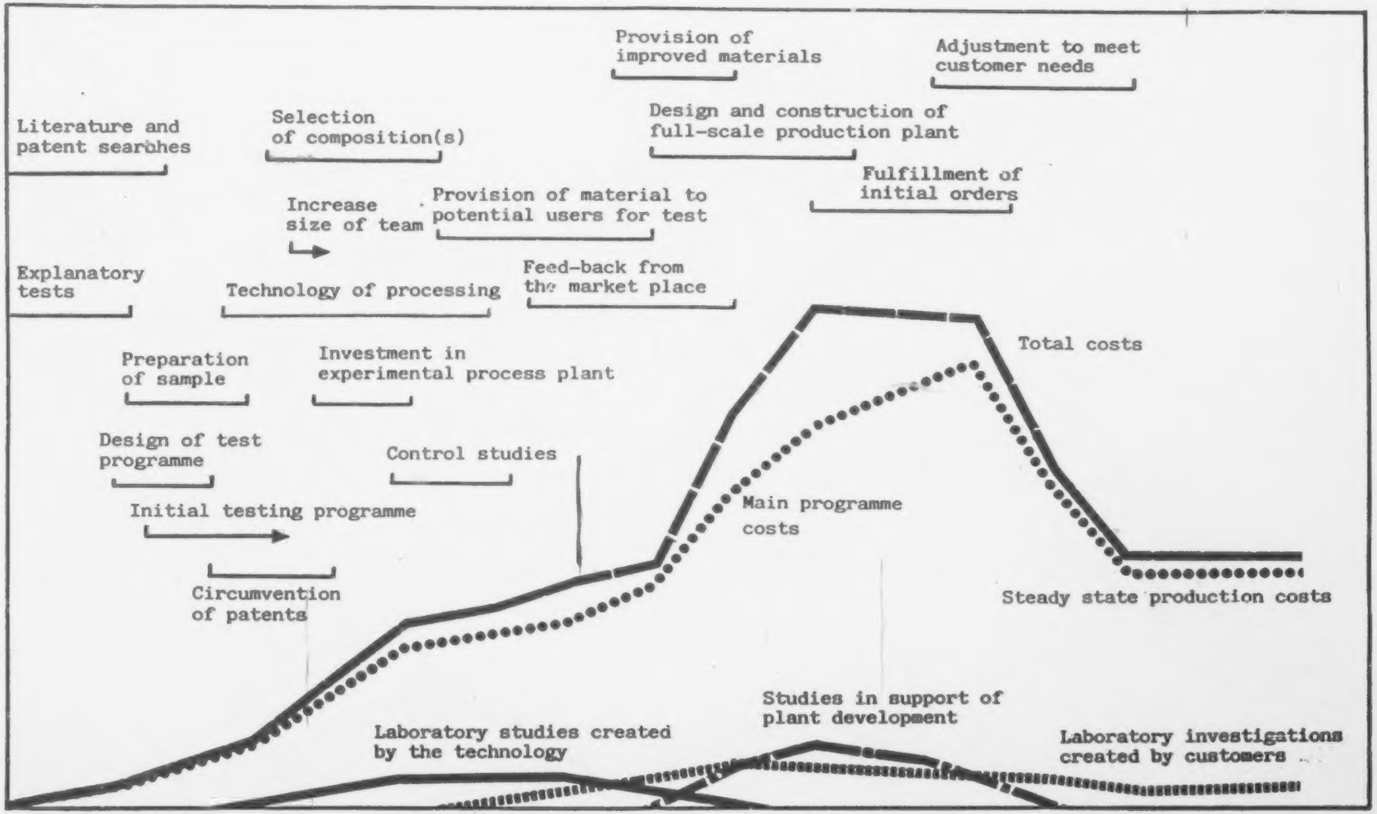
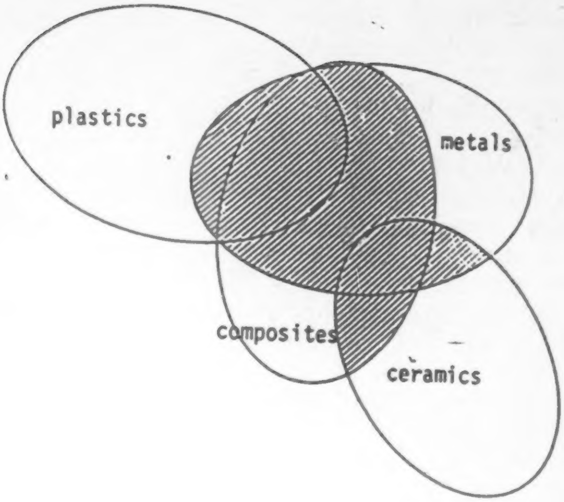


Figure 2 - DEVELOPMENT OF A NEW MATERIAL



Source: The Technical Change Center, London

Figure 3


plastics
metals
composites
ceramics

The **Chairman**. I thank you very much.

First a question, Dr. Cooney. What was your interpretation of Margaret Thatcher's comments the other day, in reference to the marketplace?

Dr. **Cooney**. Well, let me just say—

The **Chairman**. Are you familiar with them?

Dr. **Cooney**. Which comments?

The **Chairman**. A couple of days ago, she raised concern as to whether they were going too fast, or would Britain become a second-rate nation if they followed through to conclusion of the whole single-market plan.

Dr. **Cooney**. Let me say, about Margaret Thatcher, that, as you may have noticed from my biography, I was at the London School of Economics for a while. While I was living in London, she was my MP. So I did not fully understand her then, and I do not think I fully understand her now.

I would make one other comment before I get to the substance of that. In preparing this booklet, I spent some time at the Department of Trade and Industry in London. They were very enthusiastic—I was quite surprised—very enthusiastic about EC 92. I think that the level of issue that Margaret Thatcher is addressing in her public comments is principally some of the more visible political issues associated with 1992.

You have to look back at the whole history of the European Community, the whole evolution of the European Community, even going back to the Coal and Steel Community before the Common Market started—it is basically functional cooperation first, political agreement afterwards.

To a certain extent, they may have reversed that this time. They realized that with the single European act, they had to make a reinvigorated political commitment before functional cooperation could achieve a new level.

The British members of the Commission, and I think representatives of the British Government, are enthusiastic participants in many of the specific issues that, for example, we cover here, and elsewhere. But I think that where Thatcher is insisting that they go slow is on some key areas: control of fiscal policy, monetary integration, and in terms of the integrity of the Chancellor of the Exchequer and the British Government controlling its monetary policy. She does not want to be dragged behind the German train on this, like the rest of the Community.

The third area, and one where British industries fully support her, is the social dimension. Having spent ten years, in her interpretation, reestablishing a balance between labor and management in the UK labor relations, she does not intend to have this undone by a social dimension which she does not understand and which many other people in Europe do not understand. And they do not want to import wholesale certain aspects of European labor relations into the UK.

I must say on that point, certainly the Confederation of British Industries has told me that British industry does support her. So I think those are the areas—and of course there are some other areas, political issues such as free movement of the population and immigration and so on—those are the areas where the concerns are the strongest.

With regard to such areas as deregulation, access to public procurement, technical standards, competition policy, the UK is not only supportive of EC 92, but feels that it is the other members who are dragging their feet. For example, England has relatively open take-over laws. German companies can take over British companies. It is virtually impossible for a British company to take over a German company.

So I think you have to look at this in a two-tier manner, when you look at the UK position. I think you will find them being enthusiastic participants at the functional level, with some strong reservations at the political level.

The CHAIRMAN. Questions from the gentleman from North Carolina.

Mr. VALENTINE. Mr. Chairman, thank you very much.

Let me ask a question, which the answer to might be obvious to everyone here but me. We are 44 years or so from the conclusion of World War II, and all of the problems of Europe, the policy of the Germans—and of course, not many Germans who are alive now, but another race of Germans, I suppose—the systematic extermination of a whole race of people, all of the problems in France, and the squabbles, both political and otherwise, that have gone on on that continent seemingly for hundreds of years.

Why now? Why in this part of the century are we, all of a sudden it would seem, confronted with what would appear to be another multinational, incorporated effort, another "Japan Incorporated"?

Is it because of the fact that they have been shielded from the awesome responsibility of defending themselves through these years? Have time and tides eroded the situations that drove them apart and then at each other's throats for hundreds of years?

Dr. COONEY. Well, if you look at the whole history of the European Community over the last four years, you keep coming up on—the French word for it is "relance"—I guess that is the word for it. They keep sort of—they sort of run out of steam, and then suddenly take new initiatives.

I think, if you look at the creation of the original Common Market, that had run out of steam. They created the Common Market in 1958. It was expanded, of course, a couple of times, principally in 1973, with additional members being added. I think what happened was that, if you read the Cecchini report and other reports on the justification for the internal market program, what happened was that they realized that the Common Market was not perfect; it was very imperfect, in fact.

If you look at telecommunications products and services, the average European business pays something about—it varies a little bit, depending on the product, depending on the country—about double what an American company would spend for the same products and services. And they say, "You have to buy your phone from the French PPT, you have to use the French PPT services, and nobody else's."

How can he compete in the world market if the French businessman is going to pay two or three times what an American or Japanese businessman pays for his product?

The other thing you have to look at is what happened in the 1970s. When the Common Market was formed, many of us, myself included, said, "This was working great in the 1960s, but let us wait and see what happens when they run into problems with growth and employment."

I remember back in the 1960s, I remember seeing a poster in France saying, "There is no need to be unemployed." There was no unemployment in France in those days. In the 1970s, you suddenly have a huge increase in unemployment. The energy problem, you know some of the reasons for it.

They realized that by 1980, the idea of a common market had run out of steam. It was basically bankrupt. I do not mean bankrupt in the literal economic sense. They were consumed with squabbles over harmonization, specific technical standards, unemployment was high, growth was averaging 1 percent or less in many countries per year.

They were at a decision point: What can we do to reinvigorate this idea? That is why I think many European businesses are excited about it, because what they basically have done is to reverse the whole momentum on increasing government regulation, increasing labor market rigidity. What they are saying is, "What we have got to do is to become fully competitive at the world level, eliminate the rigidities."

I think that is what is driving this idea. I do not believe, by the way—and there may be some implications, some people may disagree—this is not an anti-U.S. idea at all, or an anti-NATO idea. I think it is really driven primarily by the economic experiences of Europe in the 1970s and early 1980s.

Mr. VALENTINE. Let me ask this one final question, and I realize that the time is a problem. To what extent, if any, is this new day connected or involved with changes in the Soviet Union, and the responsibility for the defense of Western Europe?

Dr. COONEY. I am not a specialist in that area, but I would cite an article recently written by the current Chancellor of Austria, saying, "Why aren't we interested now in joining the European Community?" And he said, you just have to look. There are two things going on in Europe right now simultaneously. One is what is going on in Eastern Europe and the Soviet Union. The other is what is going on in Western Europe. And he looks at them both as basically two sides of the same coin: A movement toward a new flexibility in thinking, a movement really in different aspects. But in both cases, a movement toward getting back to market-driven economic forces.

I guess that does not really answer your question, because that does not relate to the defense aspect of it. But I think that is the sort of—on both sides of Europe, they see certain logjams breaking up, the logjams of the constraint of national markets in Western Europe, and probably from our point of view the much more important logjams of communism and socialist markets in Eastern Europe. I think that is probably the relationship between the two.

The CHAIRMAN. The Chair recognizes the gentleman from Missouri, Mr. Volkmer.

Mr. VOLKMER. Thank you very much, Mr. Chairman.

I have a little thought in listening to this and seeing what is going on over there. And I agree with you what they are trying to do is to help themselves, more than to hurt anybody else. But in the process—and the process is going to be ongoing—are they not going to be more interested first and foremost in building up their own economic structure, before they permit others to come in and compete actively with them?

Dr. COONEY. I agree with that 100 percent. There are many people who have said that the restrictive measures that they are considering are basically accidental, that this program was driven by internal market needs, and they only realized later, "Oh, if we do this to the internal market, we have to change our quota system, or we have to do this or do that with regard to external trade," and this is only accidental.

In my opinion, this is not true. We had a meeting at NAM, when this was first on the drawing boards, I think almost four years ago, with Lord Colfield, who was originally the commissioner responsible for the internal market and the 1985 white paper.

He said in that meeting and he said later for public quote, "We are not creating a new internal market for the benefit of our trading partners."

Mr. VOLKMER. Right.

Dr. COONEY. You are exactly right. And so what our chairman said last week when he testified before Congress on this subject—and he echoes what we have been saying at NAM—is that, for that reason we have to be very careful and very forceful in the U.S. to defend our interests when they are stepped on by specific EC proposals.

We are enthusiastic about the market. We think they are doing the right thing. We think it is going to improve our trade performance with Europe. But when they take specific policies, steps that threaten our interests, we have to be ready to complain about them. And we have to, if necessary—he said, for example—take retaliatory measures, even if it means retaliatory measures in other sectors, to be sure that U.S. interests and established U.S. trading rights are respected.

Mr. VOLKMER. They are not going to get rid of—there are lots of things, like origin, content, public procurement—all of those things are not going to be gone in 1992?

Dr. COONEY. No. I think it is important to point out that the Single European Acts specifically added research and technology policy as a Community goal, number one. And in the very first line of that, it says, "The reason why we are doing this is to help European competitive posture."

Mr. VOLKMER. And I suppose, let us say, in 5 or 10 years, whenever, whatever time it takes, if they feel that they are then strong enough to compete within Europe, and everywhere in the world, globally, then you may see some further reduction of restrictions. Do you agree, or disagree?

Dr. COONEY. Well, we are hoping it comes sooner than that. Because we believe that they have offered—we will see how seriously they make that offer, how seriously they follow up on it. But they have offered to discuss, for example, public procurement, they have talked about bringing that into the GATT.

The problem that they have in the GATT is, in widening it further, they may be interested in talking to the U.S. Their companies are here now. And in certain areas, their companies are already very competitive in the energy and telecommunications fields, even though there may be trade surpluses.

But they are very concerned about what others might demand in the GATT, besides the United States. So I think the best place to discuss some of these issues would be in the context of the GATT non-tariff barrier codes, which were already established in 1979. They have not worked terribly well, but that was just the first cut. Maybe we can improve some of those codes.

The Europeans have indicated that they are particularly interested in discussing some of those issues with countries that have already signed the codes. In other words, they do not have to pay Brazil or India or someone else something—make additional payments to them, as it were, through the GATT, to sign the codes.

Rather, let us go to the countries that have agreed to sign the codes, and let us see if we can expand them and make them work better. I think that we have encouraged from our policy position, we have encouraged the USTR and the other agencies of the Government to follow up on that approach, to see where we can go with it.

Mr. VOLKMER. One last thing, because I have not studied it that well, and I am sure you have, and it has been a curiosity in my mind for some time, about this development that is occurring in the EC in 1992, in the automobile industry, where each country has protected their own manufacturers.

If we take the EC and 1992 the way it should be, that means that England or West Germany will be able to sell all of the cars that they are able to sell in Italy. Is that going to happen?

Dr. COONEY. No. Let me explain the problem, and try to do this quickly. We could be all afternoon on that one. I was with a member on the phone yesterday for 45 minutes on that issue.

Now, the problem basically is not British cars being sold in Italy, or German cars being sold in Italy. The problem basically relates to Japanese imports.

Mr. VOLKMER. I understand that. But I am talking bout the internal. Will we see that actually happening?

Dr. COONEY. The answer that I have gotten from talking to people over there is that we can be assured pretty much of two things happening. Number one, there will be some form of EC-wide quota. There will not be any restriction on British cars, Japanese cars made in the UK, that can be shipped to Italy. But there will be some sort of restriction somehow on the total number of Japanese cars, wherever they are made—made in Japan, in the U.S., or whatever. That remains to be seen. But there will be some sort of restriction on Japanese cars shipping into the European Community.

The other point they tell me is that, in principle, any such transitional arrangement like that will be temporary. But that is in principle.

Mr. VOLKMER. What it means is that the English Fords will be sold throughout Europe.

Dr. COONEY. Yes.

Mr. VOLKMER. Without restriction?

Dr. COONEY. In effect, they do a lot of that now. There is a lot of trans-shipment now. Certain lines of GM cars—

Mr. VOLKMER. A certain amount, but I do not think that you see the wholesale—maybe it is just nationalism.

Dr. COONEY. The other problem you have there on the auto quota issue is, you have conflicting standards. That is one reason that you cannot.

The obvious one is, of course, the British car has the steering wheel on the wrong side. But there are other problems, too, with respect to conflicting standards, and they have to harmonize with U.S. safety rules. And when you send—you cannot buy a Mercedes in Germany and bring it over here directly; it has to have certain conversions done on it—our pollution rules, and so on. You have that same problem in Europe now.

So they are talking about harmonizing those standards on the one hand, and they are working on those harmonizations. But the real sword of Damocles that is being held over the European car industry is what to do about differential treatment of Japanese imports, once you remove internal market barriers. There is nothing to prevent some guy in Germany from importing 500 Nissans in Hamburg, and shipping them all south to Italy and selling them there.

The CHAIRMAN. Would the gentleman yield on that point.

I think Mr. Volkmer is coming to a very strong point, if you listened to the thread of the testimony today. You made a comment, you said that it was your observation that these activities that are taking place are not anti-American, pre- determined anti-American.

Dr. COONEY. Yes.

The CHAIRMAN. Then we talked about the Japanese getting into the marketplace, and Americans getting into the marketplace. And we talked about the Japanese—and West Germany, particularly—having more facilities to be able -to produce there. And we talked about the situation, to Mr. Volkmer, about what happens with the automobile situation as far as Britain is concerned. And then, we talked about American firms—

Mr. VOLKMER. That applies to all of the countries, not just England, all of those that have an automobile industry.

The CHAIRMAN. But I am leading to a point. The point I am trying to get at is that we see certain basic things happening. The Japanese are building more facilities to produce in Europe. Fair point?

Dr. COONEY. Yes.

The CHAIRMAN. And the Americans are looking to merge firms, and so forth and so on, to have their presence there. What does all of that mean, as far as their ability to be able to produce and in effect sop up that marketplace, even though they are Japanese—do you understand what I am trying to say? The jobs are not produced in the United States. The economic dynamics are not in the United

States. They may bank in Eurodollars, but it is going to take economic dynamics away from the United States; it has to.

The market is there, unless I am pretty stupid, the market is there. The market can absorb so much saturation, no matter what the marketplace may be in.

Dr. COONEY. You have really raised two points there, and I would like to address both of them. The first point, I think, is, what about the whole tendency to invest more in Europe to service that market, and what does that do to our trade surplus with Europe, or our trade balance, the whole export picture?

Our answer to that one is that basically—and the tendency goes back over decades—our exports statistically are strongest where our investment is the strongest. And so, for example, 50 percent of our exports go to Canada and the EC, about one-quarter to each, slightly more than that to the EC than to Canada. Over 50 percent of our manufacturing investment today is in the European Community.

And the other factor that I would mention is that over one-third of our exports are capital goods, which means that goods that go to factories or offices or whatever for creating other goods and services—that is our strong point, that is our strong suit. That is where we have our biggest comparative advantage.

The other thing that I would mention is something like—I did submit some other testimony recently, so I can recall the figure—about 30 percent of all U.S. exports to Europe today go directly to affiliates of U.S. companies that have investments in Europe.

Putting all that together, that tells me that, as U.S. investment in Europe increases, there may be some displacement from exporting to local sourcing. But there will be a big net benefit for U.S. exports in total to Europe, as a result of increased investment there. That is the first point.

Now, the second point you have raised is a tough one, and I do not know how the Europeans are going to answer it. It will be a tougher world for us out there. That is, what if the Europeans are successful?

The Japanese, by the way, today, their investment in Europe, the last figure I saw was I think something on the order of $2 billion. Whereas, for example, ours in manufacturing alone is $65 billion or $70 billion, and total investment is well over $130 billion. And the Japanese investment in Europe is behind their investment in East Asia, way behind their investment in the United States, behind their investment in Latin America. It is their fourth or fifth biggest region. So they are way behind.

You hear all the talk about the Japanese who are rapidly increasing their investment in Europe. They are rapidly increasing it, but they are starting at a very low base.

Anyway, if that ploy does succeed, and they encourage the Japanese to invest more in Europe, rather than exporting to Europe, be it in the auto industry, be it in computers, be it in semiconductors, that is not necessarily a happy ending as far as European industry or American companies in Europe are concerned. It means that you have added new competitors into the market.

In current industry for example, the Europeans—they are all making money now in Europe, but they all claim that there is over-capacity there. So you tell the Japanese, "Okay, okay, you can have the market, you can compete freely in our market, but you have got to produce 80 percent of your product here." Is there room for 2 or 3 more big producers to set up plants in Europe?

For example, the head of GM-Europe, Robert Eaton, gave a speech last year in which he calculated that if the Japanese set up their factories in Europe, or export, however they do it, and they take one-third of the market roughly in terms of units sold, roughly what they did in the United States in the early 1980s, that would mean the closure of ten existing assembly plants and the loss of 300,000 jobs in Europe.

That is the impact of the Japanese doing that in today's market in Europe. So that is what they are encouraging the Japanese to do, or they seem to be moving in that direction. I do not know, to be quite candid, if the Europeans have fully thought out the consequences for their own industry. And by that, I include our companies that manufacture in Europe as well—whether they fully have thought through the consequences for the European industrial base, on forcing the Japanese to move their operations to Europe.

The CHAIRMAN. The gentleman from Missouri.

Mr. VOLKMER. I am completed.

The CHAIRMAN. The gentleman from Alabama.

Mr. BROWDER. Thank you, Mr. Chairman.

Dr. Cooney, I would like to ask you a question about something that you did not write about in your report. The NAM, is your organization satisfied with the federal role in dealing with Europe 1992? You did not comment on that. You talked about the internal market.

Do you think that the United States Government should change, or should develop a policy, should do more in that area than it is doing right now?

Dr. COONEY. We are not unhappy to the present time with the policy development, per se. Now, I do not want to get into specifics of science policy. That is not my field. But in terms of how we have handled this as a trade policy and an investment policy problem, we noted the very strong reaction last year of several U.S. agencies to certain aspects of the EC 92 proposal, particularly in the area of reciprocity.

Some of our members thought that some of the departments, particularly Treasury, over-reacted and created unnecessary confrontational attitudes. But I should point out to you that that attitude has led to some very important clarifications from Europe, clarifications that our members like.

If I were to be critical—and I think they also did some very good analysis, the State Department, the U.S. Trade Representative's Office, they have all done good jobs in analyzing the issues of EC 92. Where there is a problem today is in follow-through and getting information to people. Because we think that the troops are simply too thin on the ground.

Now, it was revealed last week, for example, in discussions in another committee, that the Commerce Department, for example, has—the nexus of information we were just talking about this morning—has no representatives at the U.S. mission to the European Community in Brussels.

The second thing, if you read this booklet, what you realize, or if you listen to the Government testimony, what you realize is that you are dealing with a very diffuse operation here. You are not talking about one package, like our FTA, or even our trade bill. You are talking about a diffuse, a very diffuse activity, which extends to a lot of different areas.

And you have a Foreign Commercial Service in the United States that is the same size as South Korea's. So that is really what we think. There needs to be more resources devoted to this subject, whether redeployment of existing resources, perhaps addition of resources—that is the key problem that we see right now with the governmental response.

Mr. BROWDER. Thank you.

Thank you, Mr. Chairman.

The CHAIRMAN. We want to thank you very, very much for your participation. You have helped us a lot, and have provided a lot of basic information we need.

We appreciate your being with us. Thank you very much.

[Whereupon, the committee was adjourned at 1:14 p.m.]

APPENDIXES

EUROPE 1992 AND ITS EFFECTS ON U.S. SCIENCE, TECHNOLOGY AND COMPETITIVENESS

Background Materials

Prepared by the Staff

Committee on Science, Space, and Technology
U.S. House of Representatives
May 10, 1989

The European Community

European Community: 1992 Plan for Economic Integration

by
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Economics Division

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European Community: 1992 Plan for Economic Integration

SUMMARY

The European Community (EC) is attempting to unify the diverse national economies of its member states into one large pan-European economy by 1992. If the plan succeeds, the main barriers to trade within the European Community will have been eliminated. The 1992 plan is already well underway. The implications of this truly common market are not yet fully apparent.

In 1985, the Commission of the European Communities issued a White Paper entitled *Completing the Internal Market*. That document provided a road map for the integration of the economies of the 12 member-states into one of the world's largest economies. The leaders of the European Community member-states, through the unanimous ratification of the Single European Act in 1987, provided the political authority necessary to get the process of economic integration underway.

The plan comprises nearly 300 recommendations, or directives, for new laws and regulations that will eliminate nearly all of the barriers that affect the intra-European movement of goods, services, and people. The European Community is adopting the directives one-by-one. Although some are more controversial than others, most should be approved by the 1992 deadline. By December 1988, fully one-third of the total had already been adopted, and another 100 were under consideration.

Three major types of barriers to intra-European trade will be eliminated: physical (or frontier) barriers, technical barriers, and fiscal (tax) barriers. The EC Commission has projected that the elimination of these impediments to trade will result in economic benefits of more than $200 billion in the medium-term, in addition to creating some 5 million new jobs and boosting gross domestic product (GDP) by 7%. Other economic forecasters are less sanguine about the program, projecting only a 0.5% increase in GDP by 1995.

The European Community's major trading partners may be confronted with new economic challenges and opportunities as unification proceeds. While prospects for market expansion based on increasing integration appear promising for U.S. exporters and investors, the European Community has not yet clearly spelled out the ways in which the 1992 plan will affect non-EC trading partners. Between now and 1992, the U.S. Government and private businesses will have to pay attention to the deliberations in the European Community on the issue of economic unification. The EC is the United States' largest trading partner, and the decisions that are made in Brussels and Strasbourg (respectively the homes of the EC Commission and the European Parliament) will be felt in the United States.

ISSUE DEFINITION

The European Community is proposing to complete the economic unification by the end of 1992. Successful completion of the 1992 plan requires that nearly all internal barriers to the free movement of people, goods, services, and capital be removed. The European Community's program to achieve an integrated market by 1992 may have significant policy ramifications that are of interest to Congress. The European Community, as a bloc, is the largest trading partner of the United States, and it also accounts for nearly 40% of total U.S. foreign investment. European integration will promote economic growth, and may expand trade and investment opportunities in the EC. These new opportunities could be limited, however, if the EC adopts measures that restrict the access of U.S. companies to the benefits of economic integration. U.S. policymakers will have to pay careful attention to the implementation of the "1992" program.

BACKGROUND AND ANALYSIS

The European Community has set a target date of Dec. 31, 1992, for achieving full integration of its 12 member-states' economies into one very large pan-European economy. With 320 million consumers and a gross national product that is only slightly smaller than that of the United States, the EC will be one of the largest economic and trading blocs in the world. In the view of the EC Commission, a united Europe would be much more competitive internationally and would be able to realize significant economies of scale, higher productivity, and increased innovation associated with the potentially vast European marketplace.

The EC Commission (the body that initiates legislation in the EC) launched the 1992 program in 1985 when it issued a White Paper entitled *Completing the Internal Market*. The White Paper listed 300 directives, or laws, that would have to be adopted before the EC would be truly integrated. The 1992 program was formally sanctioned by the 12 member-nations in 1987 with the adoption of the Single European Act.

The 1985 White Paper proposed a step-by-step approach to the elimination of all barriers to the movement of people, goods, services, and capital within the EC. Internal barriers fall into three main categories: physical barriers, technical barriers, and fiscal barriers. The 1992 Plan will affect nearly every sphere of European economic life.

Customs barriers and other physical limitations to free movement are to be abolished. The harmonization of technical standards and testing and certification requirements will provide a boost to the expansion of trade in goods and services within Europe. The EC is expected to adopt standards for products that are currently regulated by each individual member-state for health and safety, environmental protection, or consumer protection reasons. Barriers to trade in services will be placed on a basis of mutual recognition and equivalence. Finally, fiscal barriers are to be eliminated by harmonizing, or more closely approximating, indirect taxes among member states. The EC Commission has issued many of the directives in draft form and more than a third have already been adopted.

The EC's 1992 initiative has been tremendously successful in generating enthusiasm and excitement in both Europe and abroad. However, some observers believe that the easy phase of economic unification has just about run its course. Increasingly, concerns are being expressed about the effect of the program on certain industries and regions within the EC. European workers and unions have also expressed a concern that the benefits of economic integration be widely shared.

The EC's trading partners have been quite vocal in insisting that "1992" not become a symbol for increased protectionism, especially in the services and public procurement sectors. Although it is still too early to predict whether 1992 will mean greater or fewer opportunities for trade and investment, it is clear that many of the crucial decisions are *currently* being decided in Brussels. The term "1992" is misleading because many people assume that nothing will happen until that date. In fact, the leaders of the EC expect to implement the last of the directives by that year. The rest will have become law well before.

Given the importance of the European Community to the United States, numerous questions have emerged concerning U.S. trade and foreign investment in the EC. Will the 1992 program result in a "Fortress Europe," or a more open and competitive Europe? Will U.S. companies be afforded the same competitive advantages as European companies? Will the EC adopt restrictive local content standards and expand the use of quantitative restrictions (import quotas)? Will the EC reject "national treatment" in favor of "mirror treatment" or some other narrowly defined form of reciprocity? Will public procurement be opened to non-EC firms? These and many other questions may emerge as the 1992 single market becomes a reality. The EC is faced with a choice over whether it will erect a Fortress Europe through bilateral protectionism or whether to build a Single Market that reinforces the existing multilateral trading system.

From Common Market to "Single Market": 1992 in Perspective

The 1992 plan represents an ambitious attempt by the European Community and its member states to develop a single coherent and cohesive European marketplace free from internal barriers. The 1992 plan was introduced in 1985 with the publication by the Commission of the European Communities of a White Paper entitled *Completing the Internal Market*. Although the plan generated little fanfare until recently, the EC Commission has been active in promoting it during 1988, and the plan has recently become a focus of attention in Europe, as well as in the rest of the world. The White Paper laid out a strategy for achieving the type of integration originally envisioned in the Treaty of Rome (also known as the EEC Treaty) that established the European Economic Community in 1957.

Subsequent to the publication of the White Paper, the European Community adopted the Single European Act (SEA) in February 1986 and ratified it in July 1987. The SEA contains a number of amendments to the EEC Treaty which call for the Community to "adopt measures with the aim of progressively establishing the internal market over a period expiring on 31 December 1992.... The internal market shall comprise an area without internal frontiers in which the free movement of goods, persons, services, and capital is ensured in accordance with the provisions of this Treaty" (Single European Act, Article 8A).

The adoption of the SEA was a logical and necessary step for adopting the various measures proposed in the White Paper. One significant change designed to facilitate implementation of the White Paper was the elimination of a requirement that decisionmaking be unanimous in favor of approval by "qualified majorities" with respect to measures concerning the internal market.

In February 1988, an agreement was reached at the EC summit meeting in Brussels to reform Community finances. This agreement may have resolved a major barrier to increased economic integration by providing the EC Commission with a budget that is large enough to carry out the 1992 program. More significantly, the Brussels summit eliminated the budget issue as a major point of contention among member states and demonstrated a continuing commitment to the goals of the EEC Treaty. Referring to the results of the Brussels summit, Roy Denman, the head of the EC delegation to the United States, said, "The Community can now lift its sights to its manifest destiny" (*A Letter From Europe*, no. 48, Feb. 25, 1988).

Implications for the United States

The United States has generally favored increased European integration. At times, U.S. interest has been higher than at others, but nevertheless, no opposition to the idea of integration has been voiced. Recent progress toward the goal of an integrated European market has been considered generally to be a favorable development. The potential benefits for the United States are numerous, with expanded trade and investment opportunities considered to be the principal economic benefits. Increasingly, however, concern has been voiced that the European Community may take measures to exclude the United States from the integrated market. Whether such concerns are justified is open to debate. Nevertheless, the U.S. Government Interagency Task Force on the Internal Market issued a report in December 1988, that identified several potential areas of concern, including protectionism, reciprocity, and transparency and public procurement.

Protectionism

Some EC member countries use import quotas to protect certain domestic industries, especially automobiles and textiles. The EC Commission has indicated that transitional measures may be adopted to provide "temporary" protection to affected sectors. Although such protection might be temporary, it would effectively expand trade restrictions from localized segments of national markets to the entire European Community. The Administration position is that GATT-illegal national requirements should not be expanded because of their possible effects on U.S. exports. The risk to the United States would primarily be trade diversion by countries that may find themselves excluded from the EC market.

Increased protection in other areas are also a cause for concern. In August 1988, for instance, M. Peter McPherson, of the U.S. Department of the Treasury, argued that new and greater discrimination may result from a protectionist impulse that may accompany the development of EC-wide commercial and industrial policies. As an example, he cited the following areas where new policies are being developed: the right of establishment, mergers and acquisitions, government procurement, subsidies, local content requirements, and standards and certification. Mr. McPherson stated that discrimination in these areas would violate existing obligations under the OECD, the GATT, and the Tokyo Round Codes.

Reciprocity

Reciprocity is another area of concern to the United States, because of its potential to undermine multilateral trade liberalization in the Uruguay Round of the GATT. Although the EC Commission favors multilateral trade liberalization, it will probably pursue bilateral liberalization as a parallel process. Where agreement cannot be reached multilaterally or bilaterally, the EC will probably act to deny market access to those countries that deny access to European firms.

Of particular interest to the United States are Community-wide rules affecting banking. The EC Commission has indicated that it will grant third-country banks an EC-wide right of establishment and the ability to offer universal services if EC banks are given reciprocal treatment. This requirement may limit access by U.S. banks to the EC market because of U.S. banking regulations that restrict banks both geographically and in terms of the services that they may offer.

The Interagency Task Force on 1992 has taken the position that national treatment, rather than strict reciprocity, should be the standard for access. The banking and financial services rule proposed by the EC Commission illustrates the problem with strict reciprocity: in order for U.S. financial institutions to retain access to the EC marketplace after 1992, the United States would have to change its banking regulations to permit banks to do things that are currently not allowed by law.

Reciprocity may be one of the major policy issues during the years leading up to 1992. Growing protectionism in either the United States or the EC could elicit a protectionist response by the other. On the other hand, national treatment might emerge as the guiding principle for U.S.-EC trade relations if occasional tensions are diffused through a regular and open dialogue between the United States and the EC.

Transparency

The 1992 program is being implemented through 285 directives. Prior to their adoption, each directive is published and circulated for comment. The State Department has stated that "the U.S. is encouraged by Commission declarations that the EC will proceed in an open and transparent fashion as it constructs the single market...." The Reagan Administration took the position that countries which are not members of the EC should be allowed to review and comment on Commission proposals in a "meaningful way."

Public Procurement

The development of a common public procurement policy is one of the most important issues with which the European Community will have to deal. More than any other issue, it will define whether Europe is seeking to expand its market and liberalize world trade, or whether the 1992 Plan will provide nothing more than a limited multilateral free trade agreement among the members of the Community. Restrictive public procurement practices represent a fourth major type of barrier to intra-EC trade (in addition to physical, technical, and fiscal barriers). Such practices also tend to reduce international trade opportunities, as well as the competitiveness of the countries that employ systematic discrimination against nondomestic firms in public procurement.

Competition in public procurement is practically nonexistent at the Community level. Discriminatory practices are used by national governments as a matter of public policy to exclude non-national firms from competing against domestic companies. The EC Commission has proposed opening all public purchasing (including public procurement, i.e., the portion of public purchasing covered by formal contracts) to intra-Community competition.

The value of government procurement in EC member states has been estimated at approximately $490 billion per year, but only 20% of such contracts are subject to open tendering. The EC Commission has calculated that only 2% of public supply contracts and only 2% of public construction contracts have been awarded to firms from other EC member states. The long-range goal of the Commission is to open about 80% of public purchasing to EC-wide competition.

Foreign, or extra-EC, participation in public procurement may be limited to those countries that provide reciprocal access to the EC. Because of the importance of public procurement and the possibilities for U.S. businesses should the procurement process become open, the issues of access, national treatment, and local content are of importance to the U.S. Government and U.S. business alike.

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EUROPE 1992

THE CHALLENGE TO U.S.

Industries in the 12-nation European Community are already rationalizing and reorganizing in anticipation of unification in 1992. Their redeployment has sobering implications for many American industries.

By John S. McClenahan

Europe is gearing up to give U. S. industry a real run for its money. Not only in the "Old World" on the other side of the Atlantic. Nor just in the fast-paced markets of the Pacific. But on Main Street U. S. A. as well.

That is the simple, stark, and sobering reality that lies behind all the hoopla you have been hearing about "Europe 92."

More efficient, competitive, and aggressive European firms will be a "very specific byproduct" of the 12-nation European Community's (EC) attempt to create a single, unified, and open market by year-end 1992, confirms Robert Crawford, the chief of U. S. investment for the Scottish Development Agency.

The EC's aim in promoting a truly European market "is not to have European industry eat up the internal market and savage each other on that internal market," stresses Brian Hartnett, an attorney in the Brussels office of Squire, Sanders & Dempsey. "The idea is to have a bigger, and better, and more efficient player in order to compete at an international level."

Looking ahead, European telecommunications-equipment, pharmaceutical, and civilian aerospace companies are likely to mount the greatest challenge to U. S markets, indicates an analysis produced for INDUSTRY WEEK by A. T. Kearney, a Chicago-based management-consulting firm.

European banks and producers of autos, computers, electronics, food, and beverages will present a lesser—though still significant—"medium"-level competitive threat to their American counterparts after 1992, contends the Kearney study. Only U. S. truckers, airlines, and insurance firms appear to be at relatively low risk from European competitors—at least for the moment.

The bottom line, however, is that no American industry can afford to ignore what's happening on the other side of the Atlantic. Whether U. S companies are ready or not—and many are not—the Europeans are mounting a challenge for mar-

Andrea Baruffi

ket share that could well play out for the next two decades.

But American industry need not—indeed, should not—wait until 1992 to start assessing the seriousness of Europe's competitive challenge. The rationalization, reorganization, and redeployment of European industrial resources are already underway.

- For example, as a result of Grand Metropolitan PLC's January 1989 acquisition of a venerable Minneapolis food processor, the pudgy Pillsbury Doughboy now speaks with a British accent.
- Passengers on several American Airlines flights daily take to the skies in the Airbus 300-600R, a product of a British/French/West German/Spanish consortium.
- The Dutch-based Philips Group lights American homes and factories, shaves American faces, and opens American garage doors—and employs 52,000 people in 34 of the United States.
- Of the $261.9 billion worth of foreign direct investment in the U. S. in 1987 (the most recent full year for which data are available), the EC accounted for about $157.7 billion, an impressive 60.2%, Kearney reports. The United Kingdom—with $74.9 billion worth of direct investment spread over a range of companies that includes natural resources, food, chemicals, equipment, and financial services—was the EC's largest single investor in America. In contrast, U. S. firms had just $122.2 billion in direct investments in the EC two years ago—with $44.6 billion parked in the U. K.

In addition to all the other evidence these days in Brussels, the EC's home base, the volume of legal inquiries relating to acquisitions, joint ventures, and restructuring of distribution channels is "unprecedented," reports Squire, Sanders' Mr. Hartnett. "The individual [European] players have taken 1992 to their hearts—and 'Big is Beautiful' is the message written all across 1992," he says.

European pharmaceutical companies are among the companies on the other side of the Atlantic likely to be playing the competitive game from a position of particular strength. In contrast to American drugmakers, Europe's "big players" in pharmaceuticals also are the "big players" in chemicals, points out J. Michael Griem, a Kearney vice president. The resulting degree of industrial integration bolsters competitive advantage.

In the related area of biotechnology the EC is not yet much of a factor in world markets. "There aren't that many people making money out of it," observes Philip F. Banks, Kearney's international vice president in London. But some of the research projects the EC has sanctioned do cover biotechnology, and "there is increasingly the realization that Europe has to do something," he says.

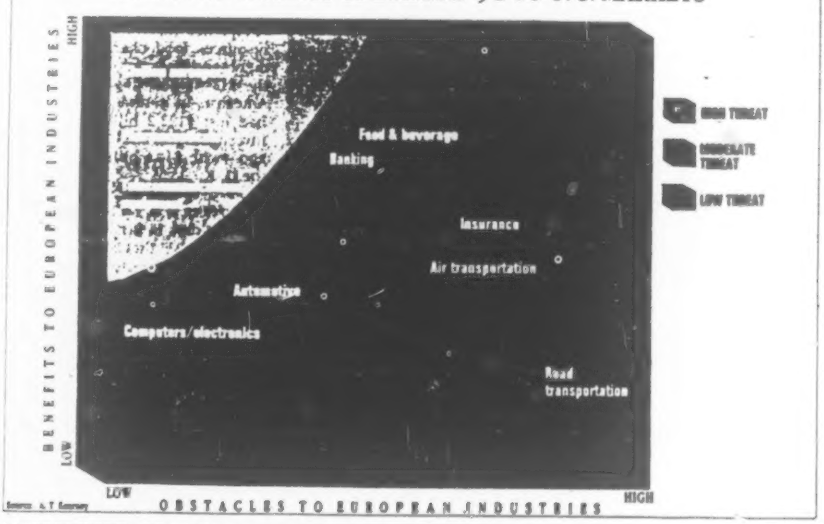
Like pharmaceutical and chemical producers, European computer and electronics manufacturers are linked for success, claims Mr. Griem. They tend to combine both lines of business in a single firm, and "that gives them the capacity to move forward faster." But because their marketing costs of entry into America are believed to be so great, EC computer and electronics companies will pose just a "medium" competitive threat to U. S. markets, Kearney says.

European telecommunications firms stand to benefit from the adoption of similar technical standards and more open procurement policies within the EC, contends the Kearney analysis. Common rules and regulations in the 12-nation "domestic" market beginning Jan. 1, 1993, promise to help build economic mass, increasing Europe's competitive strength in switching and transmission equipment, for example.

Europe promises to be a force in value-added networks, the systems that allow sophisticated telecommunication to take place, suggests Mr. Griem. "This is the newer technology, the way in which we are going to converge voice and data in the future," he contends. It is "an important area where the speed and growth in Europe is going to provide scale, the size of organization, the skills, and the research and development necessary to drive ahead," he says. "America: Watch out!" warns Mr. Griem.

Significantly, the Europeans are not waiting until 1992 to start pumping competitive iron into telecommunications. Working out this very day with a routine dubbed Research for Advanced Communications in Europe, they're collectively trying to build vital R&D muscle. What's more, some European telecommunications companies already are supplementing their R&D drill with strategic alliances in another effort to add economic bulk. For example, West Germany's Siemens AG and the U. K.'s General Electric Co. (no relation to the U. S. GE) are trying to acquire Plessey in the U. K. And moving beyond the borders of the EC, Siemens has acquired ROLM from IBM, "thereby eliminating a smaller telecommunications-equipment manufacturer in Europe and increasing its presence in the U. S. telecommunications mar-

INDUSTRY THREATS OF EUROPE '92 TO U. S. MARKETS



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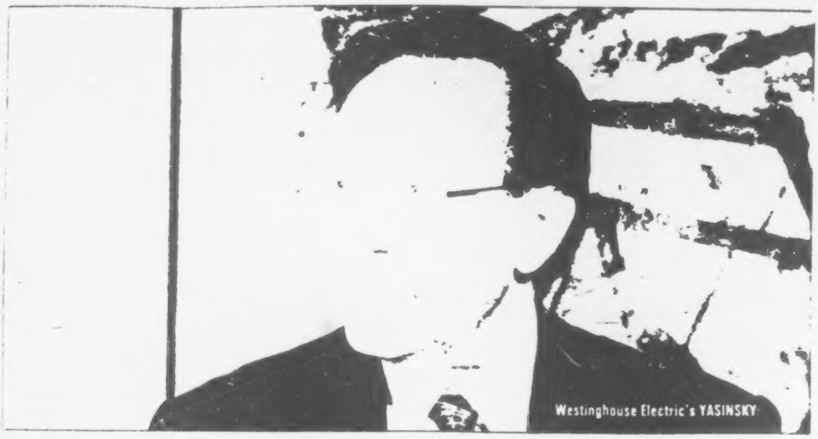

Westinghouse Electric's YASINSKY

'WE HAVE MORE OPPORTUNITIES TO GO INTO THEIR MARKET AND COMPETE WITH THEM.'

ket,'' notes Kearney's competitiveness study.

Europe could even make a mark in America on fine paper—perhaps by supplanting Canadian suppliers, believes Dr. Robert Forster, assistant professor of forest resources and Canadian studies at the University of Maine in Orono. Bonded, coated, writing, and other fine papers carry the economic attraction of being relatively high value added.

The Europeans cannot count, however, on a totally smooth competitive cruise across the Atlantic and onto the American continent. Nor should they bank on a swift and rapid rise in other world markets in which Europe and the U. S. compete.

"I don't see U. S. industry—or Japanese industry—sitting at rest and letting the Europeans catch up,' states Michael Bonsignore, president of Honeywell Inc.'s International Div., Minneapolis. Indeed, during the last two years, Honeywell has shifted from regional to global business planning, written off redundant manufacturing and engineering operations, and improved communications among its worldwide business teams—all with the aim of being more competitive.

Consider, too, that Europe is unlikely to have completely rationalized, reorganized, and redeployed its industries by the end of 1992. True, by New Year's Day 1993, a few European companies will have firmly established themselves as world-class competitors. But others will still be struggling with the transition. And some firms will be history.

Holland's Philips and West Germany's Siemens already are global companies—and they are looking to an unfragmented EC market as a more potent base from which to leverage their global positions, notes C. K. Prahalad, professor of corporate strategy at the University of Michigan's Business School in Ann Arbor. Philips and Siemens are likely not only to survive the industrial restructuring that's taking place in Europe as 1992 approaches, but also to prosper from it.

However, at the same time that these substantial manufacturers are building for the future from a position of strength, smaller and less well-positioned European firms will be fighting for their business lives.

Automotive, computer, food processing, semiconductor—even defense-electronics—firms in Europe will have a tough time assembling enough economic mass to survive, believes Prof. Prahalad.

Italy's Fiat is one of the companies the Michigan professor terms "extremely vulnerable." Though No. 1 in autos in Europe with a 15% market share, Fiat generates 60% of its business in Italy alone, notes the professor. "So, if you ask me which one [Fiat or Ford?] I would rather have [to cope with the rigors of competition in Europe], I would have Ford" (with its 11.5% European share more evenly distributed across Belgium, France, Luxembourg, Spain, the United Kingdom, and West Germany), states Prof. Prahalad.

European telecommunications companies may not achieve quite the competitive ring other busi-

> **'MANY OF THE LARGE AMERICAN COMPANIES ALREADY HAVE ACCEPTED EUROPE AS A COMMON MARKET.'**

ness analysts expect Europe '92 to produce, suggests Prof. Prahalad. For years they've been sheltered from the full force of competition by sizable public-sector contracts, and they've grown inefficient, he claims.

In addition, "Europe does not have a tradition, as we have here, where the costs of restructuring an industry are borne by the individuals," says Prof. Prahalad. When the U. S. auto industry was restructured during the early 1980s, thousands of people were laid off in Michigan, Ohio, and Indiana, he notes. In contrast, in France, Holland, and West Germany, reducing wages and shedding workers in the telecommunications industry to increase efficiency "is going to be extremely politically unacceptable," Prof. Prahalad predicts.

For U. S. industry, a more economically integrated Europe—with roughly 320 million people (compared with 245 million in the U. S.) and a total output of goods and services about 80% of America's—holds out both a cause for concern and the promise of opportunity.

"We are a little concerned that [the Europeans will] be coming into our market a little stronger—they'll be leaner and meaner," admits Dr. John B. Yasinsky, executive vice president-world resources and technology, Westinghouse Electric, Pittsburgh. "But I think we have more opportunities to go into their market and compete with them," he quickly counters. Indeed, he claims, if U. S. firms plan and execute their strategies well, they "will be the net benefactors" of Europe '92.

One reason is a lowering of European business barriers. "What they will be doing in Europe, if successful, will be truly revolutionary," claims Dr. Yasinsky. "If, for example, they open up their government procurement, we'll have access to markets we've never had access to," says the Westinghouse executive.

"Secondly—and maybe this is a little more subtle—as European firms become stronger, and leaner, and more aggressive, they will also become better partners for aggressive U. S. firms," states Dr. Yasinsky. Power-generation and transmission equipment, commercial and industrial electrical and electronic products, defense electronics, and environmental services and technology are lines of U. S. business that would lend themselves to joint ventures with European firms, he suggests.

Westinghouse and Honeywell, of course, aren't the only American firms already rising to the challenge of a more competitive Europe. For example, Gillette, 3M Co., Hughes Aircraft, and Whirlpool Corp. have moved to improve their competitive stances in Europe, reports John F. Magee, chairman of Arthur D. Little Inc., a Cambridge, Mass.-based management-consulting firm.

And Michigan's Prof. Prahalad points out that American firms constitute a good chunk of the business "establishment" across Europe. They already have the kind of "Pan-European" presence the EC envisions for its own companies. "If I look at computers, it is DEC [Digital Equipment Corp.] and IBM," states Prof. Prahalad. "If I look at semiconductors, it is Texas Instruments and Motorola—in addition to Philips," he continues. "There are 3M, Dow Chemical, Kellogg, General Foods, and on and on," Prof. Prahalad says.

"Many of the large American companies have already accepted Europe as a common market. [And now] the real challenge . . . is to get the organization together and exploit the opportunity," he stresses.

Indeed, there's still time for American industry to benefit from the changes being wrought in Europe. But there's not a lot of time. Realistic or not, Dec. 31, 1992, remains Europe's target for competitive reinvigoration—and that date is just three years, eight months, and 27 days away.

The only wrong strategy for U. S. firms is to wait to see what develops across the Atlantic, believes A. D. Little's Mr. Magee. *The* right strategy? It's unlikely that any one approach is appropriate for all American firms. So much depends on individual managements and markets, products and services. However, Mr. Magee urges managers to get their individual company strategies started now—by asking these critical questions:

- How may competition and distribution in the EC change? Where are we vulnerable? What new customers can we reach? How will our terms of compensation change?
- How can we redesign our products and services to exploit the potential scale and character of the EC market?
- How can we reorganize our production and distribution system? Can we consolidate or relocate manufacturing? How will new EC transport regulations affect our logistics? Can we look to new sources of supply?
- How can we assure access to the EC on favorable terms? Should we set up an establishment, acquire a company, or form a joint venture?
- What new management skills do we need?
- What changes in our information systems will help us track EC developments and the quality of our management responses?

"These are questions each American company—whether actively operating in the EC, exporting to the EC, or potentially threatened by stronger EC competitors—must answer for itself," insists Mr. Magee. ■

TRADE FOCUS/BRUCE STOKES

1992 and Beyond

Within the Bush Administration and on Capitol Hill, there is growing concern that without American vigilance, the effort by the European Community (EC) to create a single, barrier-free internal market by 1992 will end up as a protectionist "Fortress Europe" inimicable to U.S. interests.

This focus on 1992 is not without good reason. Europe absorbed 24 per cent of U.S. exports in 1988 and roughly 40 per cent of total U.S. direct investment abroad. Directives emanating from the EC's headquarters in Brussels will profoundly shape the fortunes of U.S. service, manufacturing and agricultural interests for years to come. But Washington's current obsession with the details of EC standard-setting and regulatory harmonization could lead U.S. policy makers to miss the forest for the trees.

"The fortress-mania presently apparent in the United States can be counterproductive," Albert Bressand, managing director of Promethee, a Paris-based business think tank, said in a recent interview. "The implications of the 1992 process [must] be analyzed in a broader perspective. The greater challenge for the United States is not a Europe that would fail to break away from a number of well-known protectionist trends, but a Europe that would break away from them in innovative ways."

Blinded by a decade-old vision of a sclerotic Europe, Washington has failed to note that a new generation of Europeans is busy crafting fresh approaches to many problems—such as regulatory reform and economic restructuring—that bedevil all industrial societies. If they are successful, and if American business and government ignore these broader lessons of the 1992 exercise, the United States may wake up to find that Europe has not only created a unified market, but has used it as a springboard to leapfrog ahead of this nation in key areas of public policy.

The Reagan Administration launched the deregulation and regulatory reform revolution in the early 1980s, but it is the Europeans who are poised to carry it into the 21st century. Continental Europe's economic planning tradition is enabling it to integrate a new commitment to a free market with a continued attention to infrastructure development—in the transportation sector, for example, where plans are in the works for construction of high-speed rail systems. Contrast this with Washington's failure to invest in new airports despite a dramatic increase in air traffic as a result of deregulation.

Similarly, Britain's orderly deregulation of its telecommunications industry is much more likely to be a model for the future than the chaos that followed the breakup of the American Telephone & Telegraph Co. And a concept of mutual recognition of national standards and testing, which would avoid endless bickering about regulatory harmonization, is emerging in Europe. This approach is likely to have a profound effect on future international efforts to create truly global markets for goods and services.

The creation of a larger, single European market will inevitably step up the pace of mergers, acquisitions, foreign investment and plant closings. The response in Brussels to this corporate reshuffling may provide a uniquely European model for the continued economic restructuring facing the United States as American industry gears up for more international competition in the years ahead.

In reforming its competitiveness policies, for example, Europe may follow West Germany's lead and permit banks to own commanding blocks of stock in manufacturing operations. Such a policy would effectively frustrate unfriendly takeovers. In that event, could the United States afford to keep regulatory policies that give U.S. firms less protection, especially with Japan also permitting such interlocking relationships?

Or, to cite another example, Western Europe's strong economic safety net of unemployment assistance and the like, which was widely criticized in the early 1980s as part of Europe's competitiveness problem, could turn out to be an ace in the hole in the 1990s by helping to minimize public opposition to business restructuring.

Finally, the 1992 process may establish business-related social policy precedents that the United States would be hard put to ignore. EC proposals to harmonize various national rules governing working conditions and labor relations could force U.S. multinationals operating in Europe into activities such as labor participation on boards of directors. If such practices do not impede their competitiveness in Europe, how will U.S. corporations continue to deny them to American workers? Similarly, the U.S.-EC dispute over hormone additives in beef is likely to be the first of several conflicts over environmental, health and safety regulations, with the EC setting stricter guidelines than the United States does. Will a post-1992 European market of 325 million consumers drive future product standards throughout the world, much as the U.S. market once did?

With their 1992 undertaking, "Europeans may have initiated the first large-scale rethinking of international economic cooperation since the U.S.-sponsored initiatives that laid the ground for the postwar reconstruction and prosperity," Bressand said. And ironically, he said, in the process of doing so, "Europe is poised to implement changes that Americans have painstakingly advocated and to do so with a more powerful set of tools than the United States has considered appropriate or even thinkable."

Faced with that prospect, at least some business leaders in the United States are beginning to look past the Washington-Brussels squabbles of the moment to fix on the bigger picture—to see what the United States can learn from the 1992 exercise about the shape of the world to come.

"I've never put much faith in [the Fortress Europe] argument," Richard E. Heckert, chairman of E.I. du Pont de Nemours & Co. and the National Association of Manufacturers, said at a recent meeting with reporters. "I don't think there is anything threatening in EC '92."

Indeed, Heckert concluded, "Maybe there will be some good role models, some maps drawn" that U.S. companies can profit from. That is a perspective on Europe 1992 that more officials in Washington might profitably adopt. □

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CRS REPORT FOR CONGRESS

THE EUROPEAN COMMUNITY: ITS STRUCTURE AND DEVELOPMENT

by
Martin E. Elling
Foreign Affairs Analyst
Foreign Affairs and National Defense Division

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THE EUROPEAN COMMUNITY: ITS STRUCTURE AND DEVELOPMENT

SUMMARY

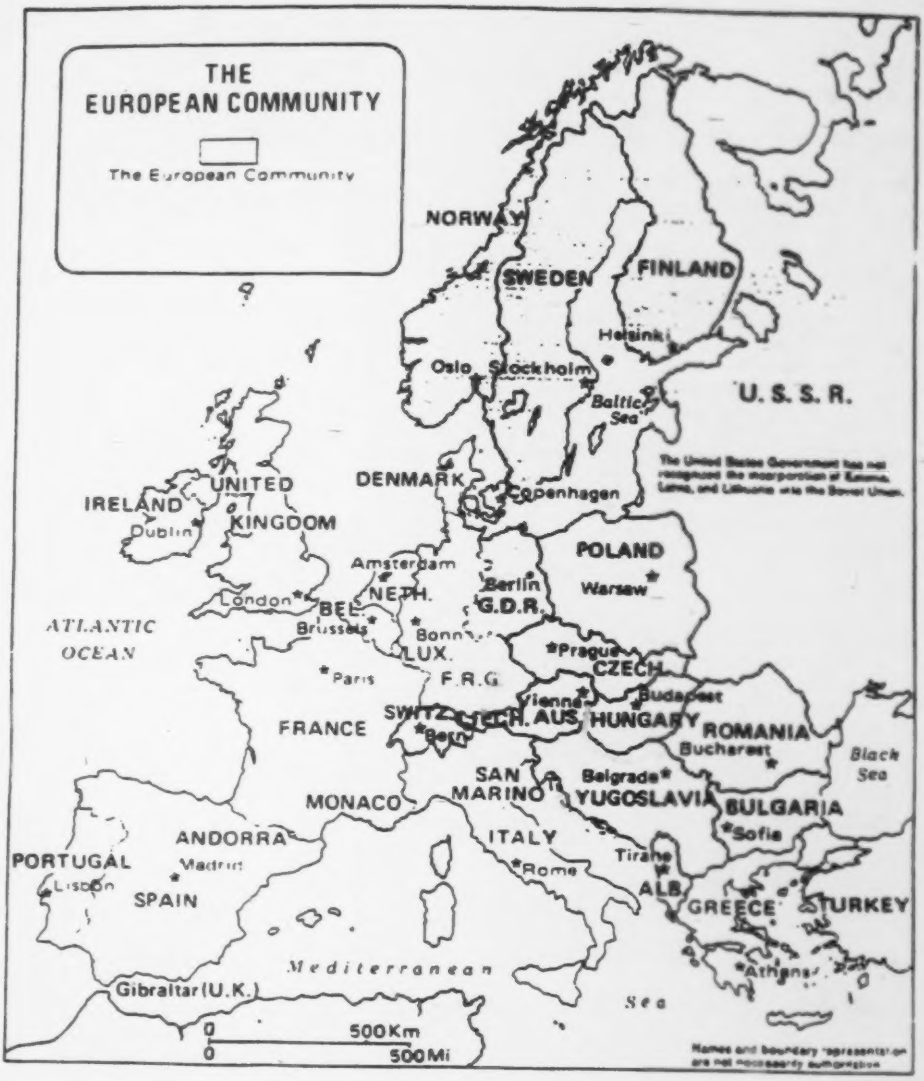
The European Community (EC) was established in 1958. The EC's initial goal was to establish a customs union in which people, goods, services, and capital could flow unhampered across internal borders. Its ultimate aim, however, was the development of a political and economic union among member countries. In 1985 the EC adopted a White Paper listing measures to be adopted for the Community to achieve a single, unified internal market by 1992. The post-1992 Community envisioned in the White Paper would allow persons and goods to travel as freely from London to Rome as they do from Boston to Los Angeles.

Since WWII the United States has supported European union, as an expression of the U.S. desire to transform war-torn Europe into a unified and militarily strong ally. The United States was disappointed when a United Europe failed to develop rapidly and when Western Europe failed to shoulder a greater share of the common defense burden.

Economic integration has been the locomotive behind political integration, but much has been achieved in both areas. The organs of the EC--the Commission, the Council of Ministers, the Parliament, and the Court of Justice--have evolved to cope better with the burdens of increased union. The Parliament, while still without true legislative powers, received in 1986 broader authority to amend proposed legislation, and the power to veto treaties and Community expansions. Power within ~~the EC~~ appears to be shifting gradually to the Parliament. The EC's Common Agricultural Policy, the completion of the customs union, the European Political Cooperation, and the European Monetary System must also be counted among the EC's significant developments.

The renewed commitment to economic integration, currently in evidence in the EC, grew for three reasons: increased competition in international markets and the economic drag of a fragmented European market made change appear imperative, a domestic political climate conducive to economic integration existed in leading EC countries, and the changeable nature of East-West relations gave European leaders renewed cause to cooperate in economic and political matters. Great obstacles to achieving the internal market still exist, however. For border inspections to be eliminated EC members would have to harmonize a myriad of policies. The socioeconomic disparities between the more prosperous industrial countries and the poorer more agricultural ones also may prove formidable hindrances.

For Europeans the main achievement of the EC to date has been the extent to which it has brought together the disparate countries, peoples, bureaucracies, and cultures of Western Europe in a cooperative effort for prosperity and peace. A more united EC would offer significant challenges and opportunities to the United States. It could increase competition with U.S. exports but could also offer a larger market for U.S. goods and services. A politically united EC could also present challenges and opportunities for U.S. policy in NATO and could become more assertive in other regions of the world, both in areas where current European policies are compatible with U.S. policies, and where they are not. The EC could also exert a greater westward pull on the countries of Eastern Europe.


THE EUROPEAN COMMUNITY
The European Community
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SWEDEN
FINLAND
Helsinki
Oslo
Stockholm
Baltic Sea
U. S. S. R.
The United States Government has not recognized the incorporation of Estonia, Latvia, and Lithuania into the Soviet Union.
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THE EUROPEAN COMMUNITY: ITS STRUCTURE AND DEVELOPMENT

INTRODUCTION

Recently, U.S. policy-makers have focused increasing attention on the European Community (EC)[1], due to the EC's efforts to complete a unified internal market by 1992[2] and growing political will in propelling member countries toward ever closer union. In spite of longstanding U.S. support for West European integration, some U.S. observers are concerned that as the twelve EC members[3] concentrate on the Community's development, they may restrict their markets to U.S. exports and may become politically more independent of U.S. leadership.

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[1] The European Community (EC) is variously referred to as the European Economic Community (EEC), the European Communities (its official name), and the Common Market (although the EC has moved far beyond a mere customs union). This report uses the term European Community because it most accurately describes the state of integration in the EC.

[2] The EC hopes to eliminate by 1992 all physical, technical, fiscal, and social barriers to trade among its member countries. This could eventually entail the elimination of all border checks within the EC and would require member governments to far more closely harmonize their tax, social, and general economic policies.

[3] The original members of the EC (the Six) were Belgium, France, the Federal Republic of Germany (FRG), Italy, Luxembourg, and the Netherlands. Denmark, Ireland, and the United Kingdom became members in 1973, while Greece joined in 1981. Portugal and Spain were admitted in 1986 boosting total EC membership to twelve (the Twelve).

There is little evidence to suggest that the United States will be faced with a politically united Europe anytime in the near future but the gradual process of economic, and to a far lesser extent political, integration appears to be continuing. As the political and economic landscape in Europe changes, as indeed it is likely to do, the United States may have to tailor the substance and style of its foreign policy to meet changed circumstances in U.S.-European relations. While the U.S. commitment to West European security remains strong, the traditional U.S. policy toward European integration may be challenged if faced with new economic barriers, recriminations about defense burdensharing, and increased European assertiveness, divergent from perceived U.S. interests, in regions of the world within the principal domain of U.S. policy initiatives.

While European integration is being achieved through a variety of fora (See Appendix A), the EC is the institution of most immediate importance to U.S. policy in Europe. The Community constitutes the United States' single largest trading partner. In 1986 it was the destination for 20.5 percent of U.S. exports and the source for 24.5 percent of its imports.[4] Moreover, it is of great concern to the United States because under its umbrella are gathered most of the member nations of NATO.

The primary purpose of this report is to depict the evolution of the EC institutions and place in context the major milestones in the development of the European Community. The Appendices provide detailed information on the development of the EC and the other institutional instruments of European integration.

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[4] Eurostat--Basic Statistics of the Community (25th Ed.). Luxembourg: Office for Official Publications of the European Communities, 1988. p. 276.

EVOLUTION OF THE U.S. POLICY RESPONSE TO EUROPEAN INTEGRATION

Throughout the postwar era the United States has given its support for the ideas of European integration and union. But as integration has progressed, divergent policy aims have led the United States to simultaneously champion the goals of European integration and fear the challenge of its eventual outcome--economic union. Since World War II, geostrategic considerations have led the United States to foster a united and thereby defensively strong Western Europe. On the other hand, as European economic integration speeds up with efforts to realize a true internal market by 1992, the question raised by some Americans is whether the EC will become a "fortress Europe" less open to U.S. exports or a more mature and possibly more challenging trading and political partner. American ambivalence toward developments in the Old World seems to reflect the U.S., and for that matter European, uncertainty about what integration will eventually mean for U.S.-European relations. The initial admiration for the ideals of European integration has been mixed with misgivings about the potential negative effects on the United States.

U.S. support for European integration was officially and genuinely unequivocal in the early years of that process and was a logical expression of the U.S. desire to transform war-torn Europe into a unified and militarily strong ally--a Europe which could shoulder the burden of its own defense. Integration was, moreover, seen as a strategic means of organically tying the FRG to the Western family of nations so that at no future time would resurgent German nationalism lead it to seek reunification at the expense of its western orientation.[5]

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[5] Telegram from Secretary of State John Foster Dulles to the U.S. Embassy in Belgium (dated 26 January 1956). Foreign Relations of the United States, 1955-1957 (Vol. IV). Washington, U.S. Govt. Print. Off., 1986. p. 399.

The 1949 Marshall Plan of economic assistance to European nations was predicated on a cooperative European effort to distribute the program monies. The signing of the Treaty of Rome in 1957 establishing the European Economic Community (EEC) transformed that cooperative spirit into a more permanent political structure. While the United States welcomed the Treaty of Rome, it was disappointed that broader progress toward true European union had not been achieved. As early as July 1955, Secretary of State Dulles, for example, had instructed the U.S. ambassador in Bonn that the United States considered it necessary for Europe to move beyond cooperation arrangements to a true federal structure, with the necessary transfer of sovereign power.[6] The Treaty of Rome fell far short of the mark envisioned by Washington.

The United States was disappointed when a United Europe failed to materialize rapidly. Washington had hoped Europe would be able to integrate economically, politically, and militarily and would be able to take on a greater share of its own defense within NATO. Senator Mike Mansfield's efforts in the early 1970s to reduce U.S. forces in Europe were, in part, symptomatic of a growing impatience with Europe's alleged unwillingness to shoulder a fairer share of the defense burden. The views which prompted Senator Mansfield's proposals have remained very much a part of the policy debate in Washington. It should be noted, though, that the disappointment and cynicism in the United States which resulted from Europe's slow progress toward union did not call into question the fundamentals of U.S. support for European integration, but rather called for that process to speed up toward the realization of mutually beneficial goals.

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[6] Telegram from the Secretary of State Dulles to the U.S. Embassy in Germany (dated 1 July 1955). Foreign Relations of the United States, 1955-1957 (Vol. IV). Washington, U.S. Govt. Print. Off., 1986. p. 307.

As the EC pushes to establish a true internal market by 1992, a second period of U.S. ambivalence toward European integration may be under way. An August 1988 speech by Deputy Treasury Secretary M. Peter McPherson, one of the first public statements by a high U.S. official on a commercially integrated Europe, highlighted recent apprehensions about European integration.[7] McPherson praised Community efforts to break down economic borders by 1992 but hinted at retaliatary measures if the EC raised barriers to U.S. exports. In what appeared to be an expression of the frustration felt by some individuals in Washington over the lack of U.S. influence in developments in the Community, McPherson called for the United States to have an institutional voice in the development of the EC. Assistant U.S. Secretary of State for Economic Affairs W. Allen Wallis stressed the positive side of an EC internal market when he remarked, "The United States wants an economically vibrant Europe. While that would make the Community an even stronger competitor, it also would make the Community an even larger customer, and both of us would benefit."[8]

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[7] Auerback, Stuart. Reagan Official Warns EC Against Erecting Trade Barriers to Other Nations. The Washington Post, August 5, 1988: F3.

[8] Wallis, W. Allen. Address before the Luxembourg Society for International Affairs, October 8, 1986. Department of State Bulletin, January 1987: 45.

WHAT THE EUROPEAN COMMUNITY IS[9]

The idea of European unity is perhaps as old as Europe itself. The founding fathers of the EC drew on arguments made in the period between the two World Wars in favor of European unity, but ironically no single force had such a great impact on aspirations for integration as the outcome of World War II. The tragic extent of the war's destruction made it clear to Europeans that they could not afford another war. In addition, the decline in importance of Europe relative to the United States and the Soviet Union, and the threat posed to Western Europe by the specter of Soviet-backed communism, made Europeans uneasy about their future in the world community. The varied efforts at integration[10] grew out of these fears and out of a deep conviction that a united Europe would be stronger, more prosperous, and permanently at peace.[11]

Era of Establishment: The 1950s

At the heart of many postwar integration efforts in Europe was the realization that Franco-German reconciliation was a prerequisite both for lasting peace and united action. In 1951 Belgium, France, the FRG, Italy, Luxembourg, and the Netherlands (the Six) laid the foundation for the EC when they signed the Paris Treaty establishing the European Coal and Steel Community

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[9] See Appendix C for a detailed chronology of the development of the EC.

[10] See Appendix A for a glossary of selected West European economic, political, and military organizations. Further, see Appendix B for a table showing membership by date in these organizations.

[11] For further reading on the origins of European integration see: Borchardt, Klaus-Dieter. European Unification--The origins and growth of the European Community. Luxembourg: Commission of the European Communities, 1986.

(ECSC).[12] Their action followed a 1950 proposal by Robert Schuman, the French Foreign Minister, in which he called for French and German coal and steel production to be placed under a joint High Authority within an organization open to the participation of the other countries of Europe.

The ECSC marked a milestone in European development both because it brought France and Germany closer together, and because it called for an unprecedented level of commitment from member states. National governments agreed to cede part of their sovereignty, albeit in limited matters, to a supranational authority chosen by, but able to act independently of them.

The Six failed in their efforts during 1952-54 to establish a European Defense Community and a European Political Community. They concluded that failure had resulted from the ambitious nature of the proposals and from their overt call for substantial cessions of national sovereignty. Believing that economic union held out the most obvious benefits to all member countries and that this was thus the area in which they would be most willing to accept curtailment of their sovereignty, the Six assigned to economic integration the role of locomotive for full political and social integration. Full integration was to be preceded by economic union. This format has essentially remained the blueprint for integration until this day.

Building on the consensus achieved in the two previous years the Six, in March 1957, signed the Treaties of Rome establishing the European Atomic Energy Commission (Euratom) and the European Economic Community (EEC). Together the Paris and Rome Treaties (the founding treaties) form the constitution of the European Community. The immediate objective of the EEC was the gradual establishment of a customs union guaranteeing free movement of goods, services, capital, and people (the Four Freedoms) among member states. Additionally, the preamble and general clauses of the EEC Treaty called for the implementation of common policies in a vast array of economic and social issues. Under the EEC Treaty, foreign policy was to remain the prerogative of the member states with the Community's powers vis-à-vis nonmember countries limited to establishing a common trade policy.

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[12] This was the first of the European Communities. In 1958 the ECSC was joined by the European Economic Community (EEC) and the European Atomic Energy Commission (Euratom). In 1968 the administrative organs of the three were merged forming, in practice, one European Community.

Sporadic Progress: The 1960s

The 1960's were a time of mixed results in the Community. While progress was made in dismantling tariff barriers between member countries, with the customs union and common external tariff being realized 18 months ahead of schedule in July 1968, significant difficulties in other areas hindered broader progress. Attempts at drafting and ratifying a plan for political union (the Fouchet Plans) failed and tensions within the Community over membership expansion were severe.

In 1962 Denmark, Ireland, Norway, and the United Kingdom applied for EC membership, but French President Charles de Gaulle's skepticism about British intentions led to a breakdown of negotiations in early 1963. These four countries reapplied in 1967 but de Gaulle persisted in his objection to expanding the Community. (New negotiations resumed in 1970 under a new French president and Denmark, Ireland, and the U.K. finally joined the EC in January 1973. In a 1972 referendum the people of Norway, however, rejected EC membership.)

The mechanism for financing the Community budget was an area of further disagreement and crisis. A proposal in 1965 to give the Community its own resources by allocating to it the levies charged at the Community's frontiers on imports from nonmember countries was opposed by France. Because of the impasse over the proposed changes France carried out an "empty chair policy" for seven months under which no French representative attended Community meetings. The crisis was finally resolved with the so-called Luxembourg Compromise which allowed any member country considering one of its "vital interests" to be at stake, to insist that decision in the EC on that issue be reached by unanimity. This was seen by many observers as a major blow to Community progress because it indefinitely delayed the implementation of majority voting which had been scheduled under the Rome Treaties to take effect at that time. Others, however, viewed this outcome as a practical solution which accurately reflected the political realities within the Community.

The crises of the 1960s are important because they point up some of the fundamental and persistent obstacles to closer union. The Anglo-French rivalry within the Community remains a significant obstacle to intensified economic and political integration. France blocked British entry into the Community, in part, because it feared a diminution of its leadership role. On the other hand, the U.K. has often blocked further integration, fearing a diminution of its national sovereignty. The divisive budget battles of the 1960s point to another lingering obstacle to further integration--the perceived disparity in the benefits received by member countries. The tremendous size of EC outlays for agriculture has increased the tensions between principal EC beneficiaries such as France, Greece, Italy, and Spain and EC financiers like the United Kingdom and West Germany.

Consolidation and External Shocks: The 1970s

The 1970s represented for the EC a time of consolidation and moderate progress. In 1970 the member countries finally authorized the Community to draw its own resources from the customs duties on products imported into the

Community as well as from up to 1 percent of the value-added tax (VAT) levied in each member country. Other innovations included 1) the establishment of the European Political Cooperation (EPC) in 1970 by which member countries agreed to consult each other before taking final decisions on major foreign policy issues and 2) the erection of the monetary "Snake" in 1972 as a loose system for foreign exchange coordination within Europe. The "Snake" was followed in 1979 by the European Monetary System (EMS), which is a more ambitious attempt at monetary union (See Appendix A).[13]

Also in 1979, the first direct elections to the European Parliament were held in the nine member countries. Until that time national parliaments had elected from among their members delegates to this EC body. The move to direct elections was largely symbolic because the powers of the Parliament were then almost exclusively consultative.

Expansion and Reaffirmation of Initial Goals: The 1980s

The 1980s have been for the European Community both a time of significant expansion southward and a time of renewed commitment to the original aspirations of the Community's founders. The admission of Greece in 1981 and of Portugal and Spain in 1986 increased the EC's population from about 260 million to just over 321 million inhabitants (1986). According to recent EC figures, the Community of Twelve accounts for 22 percent of all world trade.[14] Enlargement of the EC to include the whole of Western Europe's southern flank, except Turkey, boosted the Community's claim to be the nucleus of a future united Europe. There was (and still is) concern, however, that the economic and cultural disparities thus created by incorporating the comparatively poorer, less industrialized countries of the southern flank within the Community may indefinitely stall progress toward full integration. For instance, per capita GDP in 1986 (expressed at current prices and purchasing power parities) ranged from 17,326 in Luxembourg to 7,196 in Portugal.[15] These concerns have become far less pronounced, because of great commitment on the part of wealthier and largely industrialized northern EC members to assist poorer ones in the adjustment process; an unexpectedly deep dedication to the Community on the part of the new admitees; and waivers granted allowing them to assume full membership responsibilities slowly over time.

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[13] The EMS was designed to establish a zone of monetary stability in Europe. The European Currency Unit (ECU), primarily a unit of accounting, represents a basket of member currencies. These currencies may fluctuate up to 2.25% around agreed upon exchange rates, but thereafter intervention by national governments is mandatory. All EC members, except Spain and the U.K., are members of the EMS. While it is anticipated that Spain will soon join the EMS, the British government has staunchly opposed joining because of the necessary curtailment of its freedom of action in the monetary field. It is this opposition which is the chief obstacle to further monetary integration, although Franco-German rivalry over future monetary leadership in Europe also represents a significant hindrance.

Obstacles to integration have repeatedly emerged, but important progress has been charted during the 1980s in a variety of areas. 1980 saw an unprecedented transfer of national sovereignty to the European Commission in an effort to rationalize the European steel industry (See Appendix C--October 30, 1980). In 1983, after six years of negotiations, the Council of Ministers established a common fisheries policy. Under its terms virtually the entire Community's 200-mile offshore economic zone was opened to all EC fishermen. Given the technological and natural resource disparities between member countries in the fishing industry few experts had expected such a comprehensive agreement to be reached.

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[14] The European Community. The EC Office of Press and Public Affairs, Washington, 1987. p. 16.

[15] Eurostat--Basic Statistics of the Community (25th Ed.). Luxembourg: Office for Official Publications of the European Communities, 1988. p. 40.

One of the most significant recent developments was the Commission's submission of the White Paper on the completion of the internal market to the Council of Ministers in 1985.[16] The paper detailed some 300 actions/laws which must be agreed upon by the member countries in order to finalize the internal market—one of the original goals of the EC's founders. The White Paper received broad support in European public opinion, from governments, and within the EC institutions. By holding out the prospect of a larger more competitive market the White Paper has greatly increased the drive toward European unity and has persuaded national politicians to again put "Europe" on the front burner.

The most important institutional innovation of the 1980s was the adoption in 1986 of the Single European Act, and its entry into force in July 1987.[17] The Single European Act provided the operational changes necessary to implement the White Paper and laid the foundation for more ambitious and rapid progress toward full union. It extended qualified majority voting in four fields: the creation of the internal market by 1992, technological research and development, economic and social cohesion, and the improvement of working conditions. In addition, it extended the Treaties of Paris and Rome to cover monetary and environmental policy; increased the Commission's and Parliament's powers of implementation and oversight; and for the first time brought foreign policy cooperation officially under the treaties (See Appendix E for Text from the Single European Act relating to the EPC).

Both detractors and supporters of integration alike agree that the 1980s have been a time of tremendous revitalization in the European Community.

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[16] The Commission of the EC has the sole right of initiation in the Community legislative process. The Council of Ministers, made up of ministers from the member governments, however, has the final say in the adoption of EC initiatives.

[17] The Single European Act takes the form of an international treaty and represents an amendment to and extension of the founding treaties of the EC.

Foreign economic competition, the perception that the superpowers were too little concerned with the interests of Europe, and U.S. pressure on Europe to assume greater responsibility for its own defense, have all led to a significant rediscovery of the ideals of European union.

MAJOR ACCOMPLISHMENTS TO DATE

As one analyst noted, "the EC of today may be characterized as a customs union, with several additions reminiscent of a common market and an array of other cooperative activities that facilitate intercourse and strengthen the bonds among the member states."[18] The major initiatives and structural transformations which have been adopted by the Community and which affect U.S.-European relations are described in historical order in this section.

The Common Agricultural Policy (CAP)

One of the EC's most prominent and problematic accomplishments is the CAP which came into force in January 1962. From the founding of the EEC in 1958 the member countries had sought to reach agreement on the establishment of a common agricultural market. As negotiations progressed it became clear that to avoid massive dislocation of farmers, a common agricultural policy would have to accompany the common agricultural market. The CAP is designed to ensure uniform prices throughout the EC on most agricultural products and to guarantee farm workers a standard of living comparable to that enjoyed by workers in other sectors of the economy. This latter goal has led the Community to establish a system of preferences for Community-produced agricultural goods.

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[18] Pelkmans, Jacques. An Enterprising Community: The Common Market as Locomotive for Integration. SAIS Review, winter 1988: 137-153.

From a European perspective, despite its astronomical costs, the CAP has been successful in several respects: it has protected European producers from cheaper foreign competition, thus preserving Europe's virtual self-sufficiency in agricultural goods; it has led to uniform agricultural prices in the EC; and perhaps the greatest achievement has been the controlled but rapid reduction in the size of the agricultural labor force. Between 1960 and 1973 the number of persons employed in agriculture in the EC of Six was halved, and between 1973 and 1982 the annual rate of decline in agricultural employment averaged 2.8 percent.[19] The reduction in agricultural employment is viewed as a means of reducing overproduction and improving the efficiency of European agriculture by increasing the average land holding.

The CAP is of great concern to European and U.S. governments alike because during the 1970s and 1980s disputes over CAP outlays stalled European integration and threatened to permanently split the members of the EC. In addition, the subsidies integral to the CAP have repeatedly been at the center of disputes between the United States and its EC trading partners.[20] The CAP, imposing levies on certain U.S. products, makes it difficult for U.S. exporters to compete in the European market in items such as beef, citrus fruit, and wheat.

In 1987 expenditures devoted to agriculture amounted to 65.9 percent of the EC budget.[21] While this was in part due to the fact that agricultural policy is the only one already fully integrated (i.e. financed by the Community on the basis of joint decisions), such CAP spending has driven a rift between chief beneficiaries and chief contributors. The economic and social differences between the poorer and less industrialized countries--the beneficiaries--and the richer more industrialized, and generally northern, countries--the contributors--have been greatly exacerbated by CAP outlays. A further downside of this policy has been the "butter mountains" and "wine lakes" which have accumulated because of sheltered overproduction.

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[19] Commission of the European Communities. The Agricultural Policy of the European Community. European Documentation (6/1982). p. 55.

[20] For more detailed information, see Office of United States Trade Representative, 1987 National Trade Estimate Report on Foreign Trade Barriers.

[21] Commission of the European Communities. The Agricultural Situation in the Community--1987 Report. Luxembourg: Office for Official Publications of the European Communities, 1988. p. 96.

Pursuant to decisions taken by the Twelve in 1987 and 1988 a major revamping of the CAP is underway. An EC official asserted that as a consequence the butter mountains should have "melted away" by Autumn 1988, with the wine lakes "draining" over the course of the following year.[22] The decisions on the CAP reducing agricultural surpluses were a necessary prerequisite for the 1988 EC budget agreement which paved the way for the push toward 1992.

The Customs Union

Since 1968 the EC has, in terms of trade, been the world's largest non-national customs union.[23] Within the EC there are neither tariffs nor quotas on cross-border trade, and since 1968 the Community has had a common external tariff. While current efforts to achieve an internal market by 1992 chiefly revolve around the elimination of nontariff barriers to intra-EC trade, there are fewer such barriers to trade within the EC than, for example, among the countries of the Organization for Economic Cooperation and Development (OECD). Economists differ on the exact degree of economic benefit the customs union has had, but it is clear that it has stimulated trade among EC members. In 1958 when the Treaty of Rome established the EEC, trade among EC members accounted for only 34.5 percent of the total foreign trade of these same countries. Although one needs to take into account the fact that Community membership has expanded from six to twelve countries, in 1986 trade among EC members rose to 57.8 percent of all EC foreign trade.[24] There is also no question that the customs union has led to a more diverse offering of consumer goods throughout the EC.

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[22] Narjes, Karl-Heinz. The EC Integrated Market by 1992--Obstacles, Benefits and International Consequences. Speech at the Konrad-Adenauer-Stiftung, Washington, July 13, 1988.

[23] This is the Common Market aspect of the European Community.

Along with the customs union the EC maintains a common foreign trade policy and coordinated, if not always uniform, foreign assistance program. The Yaoundé (1963) and Lomé Conventions (1975, 1979, and 1985) are evidence of the cooperation in these fields (See Appendix C--February 28, 1975). Lomé III, signed in 1984, gives 66 African, Caribbean, and Pacific (ACP) countries virtually free access to the EC market and guarantees them stable export earnings on 49 commodities.[25] With the Lomé Conventions the EC has gone a long way to taking the politics out of its foreign aid decisions. Signatory states are treated the same regardless of alliance affiliation. The Lomé Convention is important because it forms an integral part of EC efforts to develop over time a coordinated Community foreign policy, and because it symbolizes greater European assertiveness in regions of the world not adjacent to Europe.

The European Political Cooperation (EPC)

The EPC, informally established by the Six in 1969-70 and formally brought under the EC treaties by the Single European Act in 1987,[26] is the framework in which EC members coordinate their individual foreign policies and seek to develop a joint Community foreign policy whenever possible. The presidency of the EPC rotates among the member countries every six months with that of the Community as a whole. And since July 1987, the EPC has had a small permanent secretariat in Brussels to assist the current president. By the terms of the EPC, EC member states are committed to consulting one another before taking final decision on important foreign policy matters. The EC foreign ministers meet as the EPC at least six times a year. These meetings are augmented by monthly meetings of foreign ministry representatives. In addition, EC ambassadors in capitals throughout the world meet to formulate joint strategies to local problems on an increasing basis, and in such international fora as the United Nations and the Conference for Security and Cooperation in Europe (CSCE) the EC, with increasing frequency, speaks with one voice.[27]

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[24] Eurostat--Basic Statistics of the Community (25th Ed.). Luxembourg: Office for Official Publications of the European Communities, 1988. p. 267.

[25] For further basic information on the EC's foreign assistance programs see: Europe-South Dialogue. Luxembourg: Commission of the European Communities, 1985.

[26] See Appendix E for the text of the Single European Act relating to the European Political Cooperation.

EC countries, within the framework of the EPC, often issue joint communiques on world events, but less frequently undertake joint action. Notable exceptions include the Community's swift support for the U.K. in the Falklands War and the code of conduct which was developed for EC firms to follow in South Africa.[28]

Perhaps the greatest accomplishment of the EPC is its most intangible--the requirement that EC foreign ministries consult one another on an ongoing basis has led to ever closer links among the foreign policy bureaucracies throughout the Community. These links take the form of a dedicated communications system between the twelve capitals and a myriad of formal and informal contacts between policy-makers. All of this has led to the increasing development of parallel foreign policy positions in the EC. Even on issues where the Twelve are unable to define a common Community stance, a number of constituent countries will generally take an identical position vis-à-vis third countries.[29] To illustrate, within the CSCE negotiating framework EC member countries frequently come to NATO discussions with Community consensus already developed. While they do not openly announce the existence of a prior EC position, they frequently table largely identical positions.

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[27] See for example the speeches made by Sir Geoffrey Howe, President-in-Office of the Council of Ministers, on the occasion of the opening of the 41st session of the United Nations General Assembly (September 23, 1986) and at the opening of the CSCE Follow-up Meeting in Vienna (November 4, 1986) in: European Political Co-operation (EPC). Bonn: Press and Information Office of the West German Federal Government, 1988.

[28] For an assessment of both the code's importance as an expression of cooperative foreign policy making in the Community and its significant weaknesses as a tool for changing policies in South Africa see: Holland, Martin. The EEC Code for South Africa: a reassessment. World Today, vol. 41, January 1985. pp. 12-14.

The EPC has allowed the Community to increase its voice in regions such as Latin America and Southeast Asia, although one expert questions whether a dramatic improvement, beyond the gradual coinciding of national foreign policies, is possible given the loose framework of the EPC.[30] The area of security policy is illustrative of some of these limitations. With the exception of Ireland, all EC countries belong to NATO, but they have been unable to reach agreement on how active the EC should be in security matters. The EPC now officially encompasses the economic and political aspects of European security. But while many Community officials like Commission President Jacques Delors advocate the EPC as a forum for reaching common European positions on defense within NATO, the principal European members of NATO shy away from such suggestions. The EPC will work most smoothly on matters where EC members have largely coincident interests. Latin America, for example, could thus be open to EC policy initiatives because Community members maintain similar (and not significant) levels of interest in the region.

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[29] See: U.S. Library of Congress. Congressional Research Service. A Uniting Europe and U.S. Interests. Report No. 83-72F, by Stanley R. Sloan. Washington, 1983.

[30] Regelsberger, Elfriede. Die Europäische Politische Zusammenarbeit [The European Political Cooperation]. EU-Jahrbuch (1988). p. 88.

The European Monetary System (EMS)

The EMS, while still not encompassing all EC member countries and a long way from its goal of monetary union, is seen as an EC success by many European governments and businesses. Since 1979 when the EMS was established to replace the monetary "Snake" of the early 1970's, there has been a degree of foreign exchange stability within the EC never before known (See Appendix A for a description of the EMS). This stability has facilitated cross-border trade as well as the development of larger Community-wide companies, thus enhancing Europe's international competitiveness. The EMS has also fostered macroeconomic policy convergence among member countries, further facilitating intra-EC commercial relations.

At present there is a great deal of talk in the EC about developing a true monetary union by the turn of the century. The Twelve decided in June 1988 to remove all barriers to capital flows within the Community by 1992 and assembled a committee to draft proposals for closer monetary union, decisions seen by many analysts as likely to lead to a true monetary union. Nevertheless, serious obstacles remain. The principal hindrance to greater economic union is the U.K.'s present unwillingness to join the EMS. London remains the financial capital of Europe and the British Pound one of its strongest currencies. In addition, there is an important Franco-German rivalry over future control of Europe's monetary policy, stemming in part from the Bundesbank's fear of losing its ability to maintain very low inflation rates.

HOW THE EUROPEAN COMMUNITY FUNCTIONS[31]

Understanding how the EC works on a day-to-day basis is increasingly important in the drafting and conduct of U.S. foreign policy. Frequently, U.S. officials find that questions on economic and political issues once addressed to national capitals are now handled by the EC in Brussels. Moreover, it is important for the United States to monitor the evolution of the EC power structure, for if power were to drift toward the European Parliament this could signal a change in the dynamics of European integration. The Euro-MP's are almost by definition more committed to a united Europe than their national colleagues, and such a shift in legislative power could potentially accelerate "Europeanization."

The "government" of the European Community is comprised of five principal organs: Commission, Council of Ministers, European Council, Parliament, and Court of Justice. In addition there is a Court of Auditors which assures the proper disbursement of Community funds and a variety of expert committees which in many cases must be consulted before legislation can be enacted.

The Commission: Initiator and Executive

The EC Commission is in many respects akin to the prime minister of a European parliamentary system but it must rely on the Council of Ministers, over which it has no control, to adopt its proposals. The Commission is composed of at least one representative from each member country. Members of the Commission are appointed to four-year terms by mutual agreement of the EC governments. Once appointed Commissioners are to act only in the interest of the EC as a whole and are prohibited from receiving instructions from national governments. The Commission is subject to removal by the European Parliament. The Commissioners are supported in their work by a staff of over 11,000 officials divided between 20 directorates-general.[32] Fully one-third of these employees are translators necessitated by the fact that the EC conducts its business in nine official languages.

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[31] See Appendix D for a diagram of the EC legislative process and for details of membership in the EC organs.

Only the Commission has the right of legislative initiative. It proposes to the Council of Ministers, the chief decision-making body, measures it deems necessary for the advancement and development of EC policies. The Council, in turn, may only create EC law when it acts on proposals of the Commission.

The Commission receives from the Council of Ministers guidelines and authority for the implementation of specific acts which the latter has adopted. It is then for the Commission, alone or in consultation with national experts (depending on its instructions), to implement these acts.

The Commission is also responsible for guaranteeing that the rules and principles of the common market are respected, and it serves as the general guardian of the founding treaties. It decides on requests from national governments who wish to avail themselves of their right under the treaties, in exceptional cases to temporarily derogate from specific treaty-imposed duties. It also has the power to investigate and fine individuals and companies for breaching EC competition rules; such rulings can be appealed to the European Court of Justice. Finally, the Commission has the authority to prosecute before the Court of Justice member countries for various violations of EC law.

The Commission also represents the Community in its external relations with regard to trade agreements. The Commission, following instructions it receives from the Council, negotiates all trade and agricultural agreements with third countries. The Commission is also the organ chiefly responsible for the day-to-day disbursement of Community funds.

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[32] The Directorates-General function very much like the executive branch agencies in the U.S. Federal government.

The Council of Ministers: Decision Maker

The Council of Ministers consists, as the name readily suggests, of government ministers from each member state. Its presidency rotates every six months among the member governments according to the alphabetical order of their country names. The ministerial participants in meetings change depending on the agenda. Transportation ministers, for instance, convene to take decisions regarding the liberalization of EC trucking, while health ministers meet to adopt EC policies on combatting AIDS. The foreign ministers are responsible for coordinating the more specialized and politically sensitive work of their ministerial colleagues, such as developing the general framework in which talks among finance minsters aimed at harmonizing tax rates are conducted.

Decisions in the Council are taken using a weighted voting system "apparently somehow based on both the population and economic strength of member countries"[33] (See Appendix D). Out of a total of 76 votes, 54 are needed to adopt Commission proposals. The Council is assisted by the Committee of Permanent Representatives, Coreper (from the French version of the title), which is charged with coordinating the groundwork for Community decisions. Coreper is composed of the ambassadors appointed to the EC by each member country. The Council is further assisted by a general secretariat with a staff of about 1,900 persons.

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[33] Smit, Hans & Peter. E. Herzog. Law of the European Economic Community--A Commentary on the EEC Treaty. New York: Mathew Bender & Co., 1988. (Vol. 4) p. 5-118.

The Council does not have the power of initiation and is only empowered to act on proposals from the Commission. It can alter these proposals only by a unanimous vote. If the Council adopts a measure not based on a proposal by the Commission, the measure is not the subject of the EC treaties and takes the form of a binding intergovernmental agreement rather than EC law.[34] In practice these intergovernmental agreements enjoy, however, virtually the same measure of enforcement by the Community organs as EC law itself.

While unanimity is also required for a number of other types of important decisions, the adoption of the Single European Act extended the applicability of qualified majority voting[35] to new areas: the completion of the internal market, research and technology, regional policy, and the improvement of working conditions. In reality, because of the delicate political nature of integrating the EC members, unanimity is sought to the extent practicable.

The European Council: Coordinator and Facilitator

The European Council is the name given to the heads of state or government meeting with the President of the Commission. While not originally foreseen by the EC treaties, this body has met at least two or three times a year as the European Council since 1975; before that time there had only been informal summits of the heads of government.

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[34] For instance, the Council on December 16, 1980, acting without a proposal of the Commission decided to expand the trade preferences granted to the former overseas territories of member countries. Council Decision 80/1186/EEC. Official Journal of the European Communities (L-361). Luxembourg: Office for Official Publications of the European Communities, 1980.

[35] In order to speed the decision-making process, the Council over time has narrowed the field of "vital national issues" requiring its unanimous vote for action to be taken, and has channeled many such formerly "vital" issues into a status requiring only the Council's "qualified majority"--a majority under a weighted voting system based on Member states' population--before action on such an issue may be taken. For numerical distribution, see Appendix D, p. 55.

The Single European Act officially recognized the European Council and mandated that it meet no less than twice a year, but it extended to it no official powers outside the realm of the European Political Cooperation (See Section III and Appendix D). While the European Council plays a critical role in coordinating foreign policy and giving impetus to EC progress, the EC treaties do not empower it to enact legislation; this is reserved to the various meetings of the Council of Ministers. Of course that which is decided by the heads of government often is transferred into EC law by their ministerial colleagues in the Council of Ministers.

The European Parliament: Directly Elected Advisor

Since 1979 the European Parliament has been comprised of Members of Parliament (MPs) directly elected from the member countries. Before that time members of the European Parliament had been selected by and from the members of the national parliaments. This change has added increased legitimacy to the decisions of the Parliament, even in areas where its powers are severely circumscribed. The MPs are elected every five years by universal suffrage, with elections next scheduled for 1989. The Parliament currently consists of 518 members (See Appendix D for distribution by country). Members of the Parliament sit in party groupings rather than as national delegations (See Appendix F).[36]

Because the member governments have not officially chosen a permanent capital for the EC, the Parliament's work is divided between three cities. The Parliament holds its plenary sessions in Strasbourg, but its staff of 2,900 officials is headquartered in Luxembourg. To complicate matters further, the meetings of the Parliament's 18 specialized committees normally take place in Brussels. One official interviewed likened the travails of the Parliament to "an extended game of musical chairs."

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[36] As of May 1987, the membership was grouped as follows: Socialists 172, European People's Party 117, European Democrats 63, Communists and Allies 46, Liberals and Democratic Reformists 42, European Alliance for Renewal and Democracy 34, Rainbow Group 20, European Right 17, and Independents 7.

Although the Single European Act extended its powers, the Parliament does not have law-making authority like national legislative bodies. The Commission has the sole right of initiation while the Council retains the power of final decision. The Parliament's role is to oversee the legislative process by publicly debating these actions and by posing questions of the Commission and Council.

The Parliament must also be invited to give its opinion on Commission proposals before these can be transmitted to the Council for decision. Often the Commission will revise its proposals to reflect parliamentary concerns before final submission to the Council. The Single European Act provided for a new "cooperation procedure," under which the Parliament can amend proposals of the Commission and the Council in a number of subject areas: completion of the internal market, research and technology, regional policy, and the improvement of working conditions. These amendments are upheld if the proposal is subsequently adopted by the Council with only a qualified majority. This means that in the enumerated subject areas amendments of the Parliament can only be overridden by unanimous decision of the Council.

The Parliament has several other potentially significant powers which predate the Single European Act. It can dismiss the Commission by a two-thirds majority, although it has never done so. It also approves the annual EC budget. Through its unwillingness to approve the budget Parliament can influence the overall spending priorities of the Community as it did in 1982 when it repeatedly refused to ratify the budget. Since the Single European Act came into force in July 1987, the European Parliament has also enjoyed the power to veto treaties which the EC proposes to enter into with third countries. It must now also give its assent to enlargements of the Community. It exercised its new authority for the first time in March 1988, when, in protest over events in the Israeli occupied territories, it refused to ratify newly concluded financial and trade protocols with Israel (See Appendix C—March 9, 1988).

The Court of Justice: Community Arbiter

The Court of Justice of the EC, which has its seat in Luxembourg, is comprised of thirteen judges and six advocates-general. All serve six-year terms. As in the case of EC Commissioners, these judges and advocates-general are appointed by mutual consent of the member states but the founding treaties require that they be independent and impartial.

The Court can, at the request of an EC institution, a government, or an individual citizen nullify any measure adopted by the Commission, the Council of Ministers, or a national government which is incompatible with the EC treaties. This is a far-ranging mandate which allows the Court to be active in the development of a comprehensive body of EC laws and decisions.

In addition, when a legal action in a member country leads to a disputed point of EC law, the national court can, and in the absence of a higher national court of appeals must, apply to the Court of Justice for a preliminary ruling on the applicability of EC law. Judgments of the Court in the field of EC law overrule those of national courts, creating a supranational legal regime. The Court can also, on the invitation of the Commission, give its opinion on agreements that the EC proposes to enter into with third countries. These opinions then become binding.

The Court has in recent years played an increasingly significant role in the development of the Community and its legal system. Illustrative of this is the Court's 1979 ruling in the Cassis de Dijon Case which was crucial in paving the way for rapid harmonization of national standards on the road to 1992 (See Appendix C—February 20,1979). Moreover, the Court has heard complaints brought by private citizens and affirmed the direct applicability of EC treaty-imposed principles, such as equal pay for men and women and the right of certain professionals to practice throughout the Community without seeking licensing upon crossing national borders.

The Court of Justice has become increasingly busy in recent years, prompting the drafters of the Single European Act to provide for the creation of an EC Court of First Instance. It is likely that this court, when convened (perhaps as early as late 1988), will initially have jurisdiction only over antitrust suits, cases brought by employees of the EC, and cases in a limited number of similar issue areas.

Analysis of EC Superstructure

While EC institutions are evolving to meet the goals of increased economic and political integration, much has already been done. The European Parliament, for example, may not yet have direct legislative powers but those powers which it does have allow it an important if not always definitive voice in general Community direction. One EC expert observed that, "few in Brussels these days would deny that decisions are taken and proposals formulated by the Commission with an increasingly anxious glance down the road toward the European Parliament."[37] There are signs that smaller EC countries are looking to the Parliament, because of its new ability to delay legislation and veto treaties, as a useful new ally to fight certain battles. Moreover, it was the Parliament, which spent three years drafting the European Act to establish a European Union. While member governments balked at the Act's ambitious scope the document contributed to the atmosphere in which the steps toward 1992 have been possible.

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[37] Dickson, Tim. Extra Reading Allows Members to Amend Legislation. Europe. Volume 274, March 1988. p. 32.

The Court of Justice is also seen by many as a major pillar of EC international cooperation. Progress toward 1992 would be unthinkable were it not for the activist rulings of the Court and subsequent compliance by member states. Given Western Europe's recent history and the pride which the peoples of Europe have in their own cultures and different legal systems, the Court's accomplishments in developing a truly supranational body of EC law, albeit in clearly delimited fields, are notable.

The sole right of the Commission to propose new EC measures is often the principal reason the Community is able to act despite conflicting national interests. Although the Council of Ministers often calls upon the Commission to initiate legislation, it is the latter which must actually draft it. This gives an otherwise largely absent EC dimension to any actions taken. It remains the task of the Commission to negotiate with and among the member states to secure their assent to steps toward integration. The Commissioners are charged with making the 'surrender-of-sovereignty pill' go down as easily as possible.

The EC legislative process' total dependence on the assent of the Council of Ministers, in which ministers represent their national interests, is troubling to many advocates of integration. This arrangement means that integration is especially subject to national policies, and thus to the outcome of national elections which themselves likely revolve around issues wholly apart from those of the European Community. The developments now underway in the EC could, for example, be substantially slowed if the leadership were to change in either France or the United Kingdom, where opposition leaders are less sanguine about the benefits of integration. Today, however, it is unlikely that the EC would have been as successful as it has without accommodating the interests of member states. Some experts expect to see a gradual evolution in the power structure of the EC, with the Parliament in the next 10 to 15 years coming to have true legislative powers. The Council of Ministers would, according to this view, reserve for itself an executive veto like that of the U.S. president, but perhaps significantly more difficult to override.

TOWARDS 1992 AND BEYOND

1992 has become a symbol for accelerated European integration and a focus of increasing media and business attention in the United States. "Project 1992" stands for both a concrete plan to complete the EC internal market, and for a new vision of a self-assured and more assertive Europe. Throughout the EC, including countries like Denmark and the U.K. which are generally more skeptical of integration efforts, there is a renewed commitment to the ideals of European integration and a pronounced optimism regarding Europe's economic and political future.

Origins and Goals of the White Paper and the Push for 1992

In June 1985, the Commission transmitted to the Council of Ministers its White Paper outlining 300 laws which would have to be enacted by the EC for it to complete its internal market by 1992. According to the plan, residents and goods in the post-1992 Community would be able to travel as freely from London to Rome as U.S. residents and goods travel from Boston to Los Angeles. The goal of the White Paper is to eliminate all physical, technical, fiscal, and social obstacles to trade among EC members. Both the Commission and the Council, however, have brought into their deliberations a myriad of ancillary initiatives designed to more broadly integrate member countries (e.g. student exchange programs, an EC patent office, etc.).

Support for the goals of the White Paper appears to have emerged across Europe for three principal reasons: transformations in the international economy made change appear necessary, a permissive domestic political climate was in evidence in the leading EC countries, and the instability in East-West relations gave European leaders renewed cause to cooperate in economic as well as political matters.

By 1985 the "go-it-alone" economic strategies adopted by European nations in reaction to the oil price shocks of 1973 and 1979 and to the increased competition of Japan and the newly industrialized countries (NICs) had been largely discredited. For example, by 1985 unemployment in the EC averaged 12 percent, between 1980 and 1985 consumer prices in the Community jumped 53.7 percent, and in the period 1981-1986 the Community GDP averaged an annual growth rate of only 1.9 percent.[38] These figures compared with 7.1 percent, 30.5 percent, and 2.9 percent, respectively, for the United States. Many Europeans were quick to ascribe the disparity in economic progress between the United States and the European Community to U.S. efforts to deregulate the marketplace. As one observer noted, "Incontestably, the vision of a great European internal market grew out of admiration for the American version [and] gained momentum in the early 1980's when President Reagan's America was walking at its tallest and when Europe was most troubled by the persistence of its unemployment and by the challenge of Japan."[39] In addition, the renewed backing for economic integration may have been, in part, a reaction to U.S. economic policies in the 1980s and the establishment of a U.S.-Canada free trade zone.

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[38] Eurostat--Basic Statistics of the Community (25th Ed.). Luxembourg: Office for Official Publications of the European Communities, 1988. pp. 126, 90, & 42, respectively.

The economic imperatives of the early 1980's coupled with a new political climate in principal EC countries provided fertile ground in which to sow the seeds for a rebirth of European economic integration. Great Britain's Prime Minister Thatcher, for instance, although a staunch defender of national sovereignty against ambitious attempts at political integration, wanted a pragmatic and defensible European goal for her government to champion. Traditionally Great Britain has remained more skeptical of European integration than other member countries, preferring instead to stress its special economic, cultural, and political ties to the United States. Nevertheless, Prime Minister Thatcher sought to guard against the U.K. becoming an "outcast at the outskirts" of Europe. The prescriptions of the White Paper, in their narrowest sense essentially an experiment in market deregulation, fit in nicely with the British Conservative Party's economic goals.

Similarly, in France and West Germany there was renewed support for the ideals of economic integration. France's President Francois Mitterand, after a failed attempt at reflation in 1981-82, was more than ready to consider cooperative efforts at economic management. In addition, he hoped that renewed integration would offer France a chance to play a greater leadership role in Europe. West Germany's Chancellor Helmut Kohl, who came to power on promises of liberalizing the markets, was also anxious to embrace European proposals parallel to his own. Kohl, like Mitterand, desired the increased clout which might devolve upon his country in the course of building a more united Europe.

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[39] Europe's Internal Market. The Economist, July 9, 1988: 41.

The uneven course of East-West relations during the 1980s provided Europeans with additional incentive to cooperate economically as well as politically. The heightened Cold War rhetoric of the early 1980s and the perception by some West Europeans that Europe was akin to a pawn in a complex geostrategic game did much to strengthen their conviction that Europeans must assert greater say over events on their own continent. The 1986 Reykjavik Summit, where U.S. and Soviet leaders seemed to come close to agreement on issues vital to European interests, only underscored the perceived necessity for Europe to speak with one voice so that it might better represent its interests internationally.

Obstacles Against, and Forces in Favor of the Internal Market

When the White Paper, drafted by Britain's Lord Cockfield, was introduced it was hailed by many observers as a skillful effort to hasten Europe's move toward a united market embracing 320 million consumers from the Isle of Crete to County Cork, Ireland. By not setting priorities among the 300 proposed measures and by focusing on practical ends as opposed to political means Cockfield left to Europe's statesmen the task of defining the most politically acceptable means of achieving the prescribed ends. The White Paper also gave EC politicians a finite checklist of concrete goals for which to aim.

Both the "Euro-euphoria" which is prominently in evidence in Europe and the isolated nationalist backlash obfuscate the true extent of what has already been accomplished and the obstacles which lie ahead. There has already been significant progress recorded. By May 1988, the Commission had hammered out and sent to the Council approximately 2/3 of the roughly 300 necessary measures. The Council in turn had adopted 1/2 of these, or 1/3 of the total envisioned in the White Paper. The Commission expects to transmit by the end of 1988 to the Council for its adoption fully 90 percent of the 300 measures, and further anticipates that by the end of 1988 the Council will have enacted over 40 percent of the total. That would leave four years for the Commission and Council to enact the remaining 60 percent. The Council has not acted solely on the politically expedient proposals, leaving to the end those likely to halt or reverse integration. For example, while it has not yet acted on the harmonization of the national value-added taxes (VATs), a necessary prerequisite to dismantling border checks and most likely one of the most contentious issues, it has already adopted directives which, within two years, will eliminate all impediments to capital flows within the EC. The latter had been viewed by experts as one of the most difficult issues to tackle.

The obstacles to fully achieving the goals of the White Paper anytime in the near future are still formidable. There are important groups which oppose the plans for 1992. Among these are medium-sized industries which heretofore have been sheltered by nontariff barriers to intra-EC trade, some trade unions in prosperous member countries which fear the loss of jobs to poorer regions, and a variety of nationalist elements in various countries.

Because many of the measures which remain to be enacted would directly circumscribe member countries' sovereignty, most observers now agree that the EC will be unable to eliminate all internal border checks by 1992. Such a goal would require the harmonization of immigration and asylum policies, a uniform gun control law, harmonization of VAT rates, standard regulations regarding animal health, etc. For border checks to fall Spain, for example, would have to give up its policy of granting Spanish-speaking Latin Americans citizenship, just as Denmark would have to cancel its passport union with non-EC Nordic countries. Radical and violent groups such as the Irish Republican Army (IRA) and the Basque separatists also give EC governments pause about eliminating all internal border inspections.

While the obstacles remain formidable there are reasons to expect the renewed commitment to integration to continue. There seems, for example, to be a broad coalition of significant and powerful elements in favor of the White Paper goals. Included appear to be highly competitive major industries, some trade unions, most institutions in the financial services sector, economists, free-market politicians, and pro-European intellectuals. Business leaders, for example, are pushing the Council and Commission to maintain their prescribed deadline so it can accurately plan.[40]

Moreover, EC governments have, to varying degrees, through public relations and education campaigns undertaken to strengthen popular support for a uniting Europe. They hope that such measures will establish momentum behind the White Paper project. With few exceptions, the same governments which have supported progress in the Community and nurtured popular support for economic integration come up for reelection between now and 1992. Barring a major economic downturn, they will find it difficult to renege on their promises to develop a more united and prosperous Europe.

The institutional innovations of the Single European Act will also assist member governments in expediting legislation. Through the Act's increased acceptance of majority voting, the ability of any one member to obstruct movement within the Council on the internal market is further limited.

The Council directives adopted in June 1988, completely liberalizing capital flows within the Community may also help to support broader efforts at establishing an internal market. Once these directives take effect European banks, for example, will be far less regulated than their U.S. counterparts, enjoying an unrestricted market of 320 million potential clients. This development, analysts argue, could release economic forces which will pull the Twelve closer together, facilitating harmonization of economic policies, and perhaps requiring a European central bank.[41] Recognizing the macroeconomic implications of a common capital market, the twelve heads of government at their June 1988 Hanover Summit established a commission to map out possibilities for closer monetary union, including perhaps a European central bank and a single currency. While opposition to such measures remains strong in some areas, some financial experts believe that freeing capital flows will initially lead to a strengthening of the EMS but will eventually necessitate the creation of a European central bank and a single currency.

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[40] Narjes, Karl-Heinz. The EC Integrated Market by 1992--Obstacles, Benefits, and International Consequences. Speech at the Konrad-Adenauer-Stiftung, Washington, July 13, 1988.

Finally, it should be noted that there are concrete economic reasons for believing the push toward an internal market will continue. Not only is competition from Japan and the NICs likely to persist, but one highly respected report concluded that completing the internal market would boost Community GDP by at least 5 percent, reduce prices [because of increased economies of scale] by 6 percent, and create 2 million jobs.[42] The total savings could total as much as 170 to 250 billion ECUs.[43] With many business leaders taking these predictions as fact there will be great pressure on Europe's statesmen to deliver on their promises.

While setbacks will likely closely accompany progress, one Danish diplomat summed up the dynamics behind 1992 by observing that, business interests and European-minded politicians are now the driving force behind 1992 and represent a slowable but a likely unstoppable force. The most likely obstacle to rapid progress, in his view, come from the nationalist backlash which could materialize in some countries. As the European "noose" gets tighter politicians may be increasingly tempted to go it alone and assert their country's national sovereignty. For example, Prime Minister Thatcher in 1988 graphically outlined the extent to which her government was willing to accept integration by refusing to reappoint Lord Cockfield, the architect of 1992, to the Commission and by declaring that her government never wished to see a "United States of Europe."[44] This attitude is particularly troubling for European-minded policy makers because the end goal efforts at integration, as repeatedly reaffirmed by the founding treaties and by the heads of government themselves, is European Union.

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[41] Greenhouse, Steven. European Adopt Plan to End Curbs on Capital Flows. New York Times, June 14, 1988: A1, D7.

[42] Cockfield, Lord. Address to the Institute of International Economics, Washington, May 24, 1988. p. 11.

[43] Cecchini, Paolo. Study Analyzes Impact of 1992 Internal Mcrket. Europe. Number 26, May 1988. p. 18.

Beyond 1992: Laying the Foundations for Self-Sustained Integration

European leaders have been actively laying the groundwork for self-sustained integration beyond 1992. Looking beyond 1992, the EC institutions, in cooperation with the present heads of government, have developed a broad range of programs to develop a "People's Europe" in which the benefits of union are clear to all citizens. These initiatives date from the Council's Fontainebleau meeting in June 1984.[45] There are essentially two types of efforts underway to bolster the dynamics of integration: efforts at developing a Community identity and efforts at increasing contact between Europeans.

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[44] Markham, James M. Britain, Not Exactly a Joiner, Still Favors a Few Barriers. New York Times, July 31, 1988, Sec. 4: 2.

[45] For a more detailed description of the People's Europe refer to: European Parliament. Fact Sheets on the European Parliament and the Activities of the European Community. Luxembourg: European Parliament, 1987. p. En III/V.

Nurturing a European Identity

At the symbolic level the Community has attempted to develop a single European identity by adopting a Community flag [twelve gold stars in a circle on a blue background], adopting a Community anthem [the Ode to Joy from Beethoven's Ninth Symphony], and by gradually replacing national passports with EC passports bearing first the name of the Community and then the name of the issuing state. "Express" lines for EC citizens, for example, have also been established at many airports in the Community to demonstrate the benefits of a "United Europe." Looking to the successor generations, efforts are underway to rewrite school textbooks to give a far more prominent position to the EC and to highlight the commonalities among the West European cultures. The Commission and Council are also working to develop a single European communications market in which radio and television programming will be able to cross borders without difficulty. These measures are designed to give citizens in the twelve countries a stronger sense of European identity. The complete elimination of all frontier checks was intended to be the cornerstone of this program but it now appears that this achievement will have to wait until sometime after 1992, which may inhibit the growth of a European identity among the Community's 320 million inhabitants.

Bringing Europeans Together

The Commission and Council have been working on the assumption that as contacts between EC citizens increase so too will the pressure on national governments to break down the barriers to free commerce and free cultural and social exchange within the Community. A number of education exchange programs have been initiated to bring various elites together. The Comett program (Programme of the Community in Education and Training for Technology) initiated in 1987 is designed to foster cooperation between universities and industry at the European level. In its first year it financed 108 university-industry training partnerships, 1,067 transnational placements of students in industry, and 271 transnational projects for various kinds of training.[46] There is also the Erasmus program (European Community Action Scheme for the Mobility of University Students) which helps students pay the costs associated with doing part of their studies at an institution in another EC country.

The Community has also been working on directives which will make a wide variety of professional diplomas universally accepted in the EC. These measures, along with recent extensions of the right of professionals to live and practice anywhere in the Community, are designed to increase the mobility of citizens in hopes of strengthening ties between member states. Other projects, not all of which are initiatives of or limited to the Community, bring various national elites into closer contact with their EC counterparts. Examples include the European Space Agency, the EUREKA program, the ESPRIT joint venture program, Airbus, and the EC research projects on atomic fusion.

Of further note is the fact that since 1981 in Ireland and Denmark, and since 1983 in the Netherlands, all EC citizens have had the right to vote in local elections. The West German government is currently considering adopting a similar law, and the Council has a measure before it which would make such a provision EC-wide. The gradual development of voting rights for EC residents living outside their country of citizenship would dramatically change the political dynamics of European integration.

In recent years there has also been a blossoming in other forms of intra-EC contact. In 1985, for instance, almost two-thirds of all holidays taken by

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[46] Commission of the European Communities. For young people: Comett, Erasmus, 'YES for Europe." European File (7/88). p. 6.

EC residents outside their own country were taken in other EC states.[47] In the long run such wide spread contacts could foster an increasing European identity, or so the Commission hopes. Also of note is the fact that between 1976 and 1984 over 1,100 physicians established their practice in an EC country other than their own.[48] Perhaps of far more immediate significance is the surge in intra-EC corporate mergers. In 1984, before the adoption of the White Paper, there were only about 60 corporate mergers across EC borders. This figure rose to roughly 160 mergers in 1987, almost triple the 1984 figure.[49] Increased transnational business contacts have spurred labor unions, consumer groups, and other lobbying groups to form EC-wide umbrella organizations to lobby in Brussels. This variety of transnational contacts is likely to add to the Europeanization of political actors in the Community of their political programs.

Prospects for Change

As Vice-President of the EC Commission Karl-Heinz Narjes recently said, the European Community is not a business but rather a political union. 1992 is most importantly an expression of profound political will to react to the imperatives of the present age.[50] Unless the underlying conditions in the global marketplace fundamentally change, he believes, Europeans will continue to see the imperatives of integrating.

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[47] Commission of the European Communities. Europeans and their Holidays. Luxembourg: European Communities, 1987. p. 29.

[48] Hurwitz, Leon. The European Community and the Management of International Cooperation. New York: Greenwood Press, 1987. p. 164.

[49] Europe's Internal Market. The Economist, July 9-15, 1988: 38. (Special Section).

[50] Narjes, Karl-Heinz. The EC Integrated Market by 1992--Obstacles, Benefits and International Consequences. Speech at the Konrad-Adenauer-Stiftung, Washington, July 13, 1988.

Most observers believe the prospects for 1992 to be quite promising. The White Paper program is already opening up the European marketplace and contributing to the development of a European identity. Support for the EC among the peoples of Europe appears very strong. In 1986, 62 percent of EC residents polled said that the EC was a good thing. Support was highest in Luxembourg (81%) and lowest in Great Britain (42%). In the period between 1973 and 1986 public support for the EC increased in all countries except West Germany and Denmark where support was quite high but declined marginally.[51]

Progress in European integration can be halted, but the dynamics of the process, especially after the White Paper, will make it very difficult to reverse. This will especially remain the case in the years ahead if the EC continues to face increased competition in world markets. Europe, under pressure from new competitors will find even more cause to join in a common effort at market efficiency. Any joint political efforts will necessarily follow joint economic efforts. Herein lies the fundamental force behind European integration. The changes ahead, the speed with which they will occur as yet undetermined, may potentially have a pronounced impact on U.S.-European relations.

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[51] Commission of the European Communities. Euro-Barometer, December 26, 1986.

IMPLICATIONS FOR U.S. POLICY: CHALLENGES AND OPPORTUNITIES

The European Community was established to secure the peace in Europe and to promote economic prosperity in its member states. But more than this it was designed to be the initial step on the way to full economic and political union, a goal traditionally supported by the United States. An integrating Europe is likely to have significant effects on U.S. global foreign policy. The efforts to establish a European internal market by 1992 may have a great economic impact on the United States, but the political ramifications might be of greater long-term significance. If the twelve members of the Community greatly increase the extent to which they act and speak with one voice in international affairs, the traditional balance in U.S.-European relations could be altered.

There are both challenges and opportunities for the United States inherent in the process of European integration. In the economic sphere a United Europe could pose a greater competitive threat to the United States in world markets. Moreover, many believe that the EC might restrict its market to U.S. exports as it looks inward in the years ahead. (This fear, it should be noted, is mirrored by European concerns about restrictive U.S. trade policies.)

There are, however, substantial economic benefits possible. An economically more robust European internal market, comprising more than 320 million consumers, could provide great opportunities for U.S. exporters. An economically and politically more unified Western Europe might also be more willing and more able to shoulder the burden of its own defense, potentially saving the United States considerable sums of money.

The challenges and opportunities for the United States in the political realm appear less easily defined but potentially more significant. According to one view, a politically united Community could pose a great challenge to

U.S. foreign policy. If the EC comes to speak with one voice in foreign policy matters it would likely become more independent of U.S. leadership, and this could have implications for the political dynamics within NATO. West Germany's Chancellor Kohl, for example, predicted in August 1988, that because of developments in the EC and elsewhere, the next century would see a realignment of economic powers into three blocs: the United States and Canada; Japan, China, Korea, and Taiwan; and the European Community.[52] In addition, a politically integrated Europe might become far more assertive in regions of the world traditionally the principal domain of U.S. policy initiatives, and its policies might be incompatible with U.S. policies.

According to an opposing view, a politically united Community could offer the United States great opportunities. The increased economic and political strength of a United Europe could bolster the Atlantic Alliance, and could deter Soviet efforts to neutralize Central Europe through plans for "one European home." In addition, a more powerful and prosperous Community would exert a greater pull on the countries of Eastern Europe. Hungary, for example, has already made overtures to the Community seeking greater ties, and on June 25, 1988, after three decades of labelling the EC "a bastion of U.S. capitalist imperialism," COMECON established official diplomatic relations with the European Community. The EC could also promote in consort with, or in place of, the United States, the economic and political values they share in common. This might be advantageous to the United States in regions where, because of historic factors, U.S. initiatives sometimes are perceived with mistrust (e.g., Central America).

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[52] Neuharth, Al. Europe in 1990s will be a "power." USA Today, August 5-7, 1988: 1.

The greatest challenge to U.S. interests is for the United States and its European allies to be flexible in the manner in which they jointly pursue their traditional common goals. The United States will have to decide whether to support European integration as it has traditionally, confident that the organic ties between Europe and the United States are inviolable, or whether to oppose and obstruct the process and thereby risk alienation.

APPENDIX A

A Glossary of Selected Western European Organizations

Benelux Economic Union (BENELUX): BENELUX goes back to the signing of a Customs Convention in London in 1944 by the three member governments-in-exile, but achieved its present form with a further treaty which came into force in 1960. BENELUX enhances the economic links between members by ensuring the free circulation of persons, goods, capital, and services and by requiring member governments to coordinate policy in the economic, financial, and social fields. A Committee of Ministers meets quarterly and is assisted in its work by a Consultative Interparliamentary Council, a small General Secretariat, and numerous special committees. The headquarters are in Brussels. BENELUX enjoys a degree of economic integration yet to be achieved by the EC and often serves as a model for EC development. (Members: Belgium, Luxembourg, the Netherlands)

Belgo-Luxembourg Economic Union (BLEU): Dating back to 1921 BLEU, as the name suggests, is an economic union between the two member countries; BLEU grew out of Luxembourg's desire for economic stability through union with a larger partner and France's subsequent rejection of such a union. Luxembourg in the end turned to Belgium. BLEU is far more than a customs union; it is a monetary union as well. The gold and foreign exchange reserves of the two countries are held jointly, Belgian currency is accepted in Luxembourg, and the value of the two currencies has been fixed at parity since 1940. In addition BLEU guarantees the freedom of movement for workers from both members. BLEU's significance derives from its role as a model for the integration efforts of BENELUX and of the EC.

Coordinating Committee on Export Controls (COCOM): Established in 1949 by the member states of NATO, COCOM's aim is the compilation of lists of goods considered to be of strategic importance and therefore not to be sold by the West to Eastern bloc countries. It further facilitates efforts to maintain a Western strategic embargo. Its structure is classified. The headquarters are in Paris. (Members: NATO countries plus Japan)

Council of Europe (CE): Established at London in 1949, the Council membership brings together the whole of democratic Western Europe, EC members and European neutrals alike. Its goal is the achievement of greater European unity for the purpose of safeguarding common ideals such as parliamentary democracy, the protection of human rights, and the promotion of equitable economic and social progress. It also seeks to demonstrate to citizens of member countries that their lives now have a truly European dimension which goes far beyond national life. The Council consists of a Committee of (Foreign) Ministers, a consultative Parliamentary Assembly, and an International Secretariat. The Council's work primarily consists of drafting European Conventions (treaties) which are then open to accession by member states; notable among these are the European Convention on Human rights which was adopted in 1950 and which provides for supranational enforcement of human rights guarantees embodied in that document, and the Anti-Terrorist Convention of 1977. The headquarters are in Strasbourg with additional offices in Brussels and Paris. (Members: All West European countries except for Finland and the smaller states of Andorra, Monaco, San Marino, and the Vatican)

European Community/ies (EC): The EC is technically comprised of three juridically distinct entities: the European Coal and Steel Community (ECSC), established in 1951 by the Paris Treaty; the European Economic Community (EEC), established in 1958 by the Rome Treaty; and the European Atomic Energy Community (Euratom), also established in 1958 by the Rome Treaty. Overall, the EC has as its goal the realization of a free internal market and the promotion of full economic integration, the establishment of a customs union in its relations with nonmembers, and the increasing political integration of member states. There are five organs common to the three Communities. While it is only the Council of Ministers which can take decisions binding on national governments, the Commission has a vital leadership role in the daily operations of the EC and the launching of new initiatives. The Council of Ministers is comprised of the national minister from each member country responsible for the business at hand. The European Parliament, which exercises advisory and supervisory powers in relation to the Council and Commission, is formed of MP's elected directly by the national electorates. The Commission, which functions as a policy-planning body, initiating Community action and acting as a mediator between governments, is comprised of 17 commissioners jointly appointed by the member countries to act as Community statesmen rather than national representatives. While the Parliament must approve the annual budget and has the power to remove the commissioners, the Council must give final approval to legislation; a variety of voting protocols are followed for passage depending on the type of legislation being enacted. These three organs are assisted by the Court of Justice and the Court of Auditors which enforce Community laws. Headquarters are in Brussels, Luxembourg, and Strasbourg. (Members: Belgium, Denmark, France, FRG, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Spain, and the United Kingdom)

European Monetary System (EMS): The EMS was established by the Council of the European Communities in 1979 to enable closer monetary cooperation in order to establish a zone of monetary stability in Europe. The principal vehicle for these goals is the European Currency Unit (ECU) which represents a basket of member currencies. The ECU is used as the denominator for the controlled exchange rate mechanism, as the denominator for operations in intervention and credit mechanisms, and as a means of settlement between the monetary authorities in EC countries. Using the fixed composition of the basket a grid of bilateral exchange rates is set; currencies may fluctuate by margins of up to 2.25% but at the margins intervention in participating currencies is mandatory. This ensures relative stability among the member currencies. There are very limited but symbolically important signs that the ECU is beginning to be used by some as a unit of private accounting; for example, ECU-denominated savings and checking accounts are already available in several member countries and a couple of Europe's largest firms have switched to an all-ECU system of accounting. (Members: the members of the EC except for Spain and the United Kingdom)

European Political Cooperation (EPC): The EPC is the formal framework in which EC members coordinate their own foreign policies and seek to develop a joint Community foreign policy whenever possible. The EPC had its origins in decisions taken by the EC in 1969 and 1970 to intensify efforts at achieving true European union. Originally an informal commitment by the member country foreign ministers to meet and discuss joint concerns, the EPC has developed into a highly regularized process of consultation and coordination. Since the adoption of the Single European Act in 1987, the EC foreign ministers meet at least six times a year as the European Council to draft Community foreign policy. A Political Committee made up of foreign ministry representatives augments these meetings with monthly meetings of its own. The Presidency of the EPC rotates with the presidency of the EC. A dedicated secure telecommunications network has been installed between member foreign ministries and the European Commission to facilitate ongoing coordination and consultation, and since 1987 the EPC is served by a small Secretariat in Brussels. Member countries have committed themselves not to take final positions on important international matters without at least consulting all EPC partners. (Members: the countries of the EC)

European Free Trade Association (EFTA): EFTA was established in 1960 with the signing of the Stockholm Convention as an alternative to the EC for those countries which, because of their neutral foreign policy or for other reasons, are unable to join the latter. Its aim it to promote within the area of the Association a sustained expansion of economic activity, financial stability, and fair competition in trade between member states. By 1977 the free trade area had been virtually completed, with only a few internal import duties on industrial products remaining. EFTA operates through its Council which meets about twice a year at ministerial and biweekly at official levels and which consists of one representative from each signatory; decisions are taken on the basis of unanimity. Unlike the EC, decisions must always be unanimous and there is no stated or implied effort to integrate politically. EFTA derives part of its significance from the fact that the close economic ties it enjoys with the European Community (EC) keep its members in close orbit about the EC as it moves forward with its program of economic and political integration. Headquarters are in Geneva. (Members: Austria, Iceland, Norway, Sweden, and Switzerland)

Eurogroup: Established in 1968 as an informal grouping of defense ministers from the European members of NATO, Eurogroup aims at ensuring a stronger and more cohesive European contribution to the common defense effort. It serves as a forum for harmonization of European views on important political/strategic questions in the Alliance framework. There are regular ministerial meetings as well as frequent technical meetings. (Members: Belgium, Denmark, FRG, Greece, Italy, Luxembourg, the Netherlands, Norway, Portugal, Spain, Turkey, and the United Kingdom)

Independent European Programme Group (IEPG): Established in 1976 with the assistance of the Eurogroup, the IEPG is an independent informal grouping of European countries designed to improve international cooperation in the acquisition of defense equipment. There are regular meetings of the state secretaries and national armaments directors of the member countries. One of the principal reasons for founding IEPG was to draw France into cooperative European defense efforts; France had specifically declined to join the Eurogroup. (Members: the Eurogroup members plus France)

North Atlantic Treaty Organization (NATO): Established at Washington in 1949, NATO seeks to safeguard freedom and stability in the North-Atlantic area through united efforts at collective defense. The civil structure is headed by the North Atlantic Council which is composed of representatives of the member countries and sits in permanent session to provide a forum for political consultation and coordination. Also of great importance is the Defense Planning Committee (DPC) which is composed of representatives of those countries belonging to the integrated defense structure; the DPC is charged with considering a wide range of military policy matters. There is also a well-developed military structure which includes a number of supreme commands. In peacetime, with only few exceptions, national forces receive orders from their respective national authorities. Headquarters are in Brussels. (Members: Belgium, Canada, Denmark, France, FRG, Greece, Iceland, Italy, Luxembourg, the Netherlands, Norway, Portugal, Spain, Turkey, the United Kingdom, and the United States)

Nordic Council (NC): The Nordic Council was established in 1952 to act as an advisory body to the legislatures and governments of member countries in matters of common interest and where joint action is required. Major areas of joint concern include environmental protection, economic matters, and social and cultural issues. The Nordic Council has as members two neutral countries and two members of NATO. There is a Council which consists of 87 members elected annually by and from the parliaments of the respective countries in proportion to party representation in those bodies. There is also a Nordic Council of Ministers. The Council initiates and follows up cooperation efforts among the Nordic countries by issuing recommendations and statements of opinion for action by the Nordic Council of Ministers and the respective national governments. The Secretariat is in Stockholm. (Members: Denmark, Finland, Iceland, and Norway)

Western European Union (WEU): The WEU was established at London in 1955 when the Brussels Treaty Organization was modified and extended by protocols to allow for the accession of the FRG and Italy. Its main official aims are to promote collective self-defense, encourage European integration, and promote collaboration on social and cultural matters. In fact, the organization had as a principal purpose the control and monitoring of Germany's rearmament. While the organization was almost allowed to lapse into disfunction after its role vis-a-vis Germany became unnecessary, it has become the increasing focus of European attention. In 1985, at a meeting in Bonn, the member countries decided to reorganize the WEU to provide it a more active role in European security deliberations. There is a Council made up of foreign and/or defense ministers and a small Secretariat-General. Headquarters are in London and Paris. (Members: Belgium, France, FRG, Italy, Luxembourg, the Netherlands, the United Kingdom)

APPENDIX B

Membership by Country
(Showing Date of Admission)
In Selected West European Economic, Military, & Political Organizations

	BENELUX	BLEU	COCOM	Council of Europe	EC	EFTA	EMS	EPC	Euro-Group	IEPG	NATO	Nordic Council	WEU	NOTES
Andorra														
Austria				1956		1960								
Belgium	1948	1921	X	1949	(ECSC 1951) 1957		1979	1970	1968	1976	1949		1954	
Cyprus				1961	Association Agreement									
Denmark			X	1949	1973		1979	1973	1968	1976	1949	1952		
Finland					Free Trade Agreement	Associate Member						1955		
France			X	1949	(ECSC 1951) 1957		1979	1970		1976	1949*		1954	*Not a participant in Integrated Military Commands since 1966.
FRG			X	1951	(ECSC 1951) 1957		1979	1970	1968	1976	1955		1954	
Greece			X	X	1981		1984	1981	1968	1976	1952			

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APPENDIX B

Membership by Country
(Showing Date of Admission)
In Selected West European Economic, Military, & Political Organizations — Continued

	BENELUX	BLEU	COCOM	Council of Europe	EC	EFTA	EMS	EPC	Euro-Group	IEPG	NATO	Nordic Council	WEU	NOTES
Iceland			X	1951	Free Trade Agreement	1970					1949	1952		
Ireland				1949	1973		1979	1973						
Italy			X	1949	(ECSC 1951) 1957		1979	1970	1968	1976	1949		1954	
Liechtenstein				1978	Free Trade Agreement	1960*								*Through its customs union with Switzerland, effectively a member since 1960.
Luxembourg	1948	1921	X	1949	(ECSC 1951) 1957		1979	1970	1968	1976	1949		1954	
Malta				X	Association Agreement									
Monaco					*									*Through its customs union with France, effectively a member.
Netherlands	1948		X	1949	(ESCS 1951) 1957		1979	1970	1968	1976	1949		1954	

Continued on next page

APPENDIX B

Membership by Country
(Showing Date of Admission)
In Selected West European Economic, Military, & Political Organizations — Continued

	BENELUX	BLEU	COCOM	Council of Europe	EC	EFTA	EMS	EPC	Euro-Group	IEPG	NATO	Nordic Council	WEU	NOTES
Norway			X	1949	Free Trade Agreement	1960			1968	1976	1949	1952		
Portugal			X	1976	1986		1987	1986	1968	1976	1949		Has Applied	
San Marino														
Spain			X	1977	1986			1986	X	1976	1982*		Has Applied	*Not in NATO Integrated Military Commands.
Sweden				1949	Free Trade Agreement	1960						1952		
Switzerland				1963	Free Trade Agreement	1960								
Turkey			X	1949	Association Agreement				1968	1976	1952			
United Kingdom			X	1949	1973			1973	1968	1976	1949		1954	
Vatican														

X = Indicates membership where no exact date is available.

Source: The CIA's World Factbook (1987) and information provided by diplomatic representations in Washington, D.C.

APPENDIX C

Steps to European Unity:
A Chronology of European Community Development

April 18, 1951: Belgium, France, West Germany, Italy, Luxembourg, and the Netherlands (the Six) signed the Paris Treaty establishing the European Coal and Steel Community (ECSC). The United Kingdom declined to join.

March 25, 1957: The Treaties of Rome were signed by the Six establishing the European Economic Community (EEC) and the European Atomic Energy Community (Euratom). They entered into force January 1, 1958.

January 1, 1959: The first reduction in customs duties in trade between member states came into effect.

July-August 1961: Denmark, Ireland, and the United Kingdom submitted applications for membership in the European Communities (EC) [consisting of the ECSC, EEC, and Euratom].

September 1, 1961: The first regulation guaranteeing free movement of workers seeking employment within member countries came into force.

January 1962: The Common Agricultural Policy (CAP) came into force. It was based on the following principles: establishment of a single market and common prices for most agricultural products; assurance for farm workers of a standard of living comparable to those enjoyed by workers in other sectors; preference for Community produce; and financial solidarity through a European Agricultural Guidance and Guarantee Fund (EAGGF).

January 18, 1963: Four days after French President de Gaulle publicly questioned the United Kingdom's political will to join the EC, negotiations with all four applicant countries--Denmark, Ireland, Norway, and the UK--were suspended.

January 22, 1963: France and the FRG signed a treaty of friendship and cooperation, marking a high-point in Franco-German rapprochement.

June 1, 1964: The Yaoundé Convention came into force as an association agreement with 18 African countries, providing them with favorable trading terms.

June 30, 1965: Following disagreement over a proposed change in the method of funding the EC, France initiated seven months of an 'empty chair' policy under which no French representatives attended Community meetings.

January 29, 1966: The impasse with France was resolved by the Luxembourg Compromise which allowed any member country which considered a 'vital interest' of its to be at stake to insist that decision be reached by unanimity. This delayed the implementation of majority voting which had been scheduled to take effect at this time.

May 11, 1967: The UK reapplied to join the EC. It was followed shortly by Denmark, Ireland, and Norway, but de Gaulle remained recalcitrant in his opposition to British accession.

July 1, 1967: By treaty, a Single Council and a Single Commission for the ECSC, the EEC, and Euratom are established, replacing the separate organs heretofore used by each.
July 1, 1968: The customs union was completed eighteen months ahead of the timetable in the EEC Treaty. All customs duties were removed in trade between member states, and the EC finally set up its common external tariff.

December 2, 1969: At the conclusion of the Hague Summit the Heads of Government issued a joint communique which symbolized renewed vigour in the process of European integration, which called for the completion of economic and monetary union, and presented an agreed upon method of financing the CAP.

April 22, 1970: The Six reached agreement on a new funding system for the EC. Under the plan, the Community was to thereafter receive all customs duties on products imported from non-member countries, all levies on agricultural products, as well as up to 1% of the national value-added taxes.

October 27, 1970: The member states adopted the Davignon Report establishing the European Political Cooperation (EPC). They agreed to consult with one another before taking a final stand on major foreign policy issues.

April 1972: The monetary "Snake" was established by the member states to provide coordinated foreign exchange rates within Europe. Intervention was required when currencies fluctuate more than 2.25% from their target.

January 1, 1973: Denmark, Ireland, and the United Kingdom joined the EC boosting its membership to nine. Norway failed to join after a popular referendum rejected the proposed accession.

January 1, 1973: Free-trade agreements came into force between the Community and most EFTA countries, while agreements with the remaining EFTA countries came into force shortly afterwards.

December 10, 1974: The heads of government meeting in Paris decided they should henceforth meet no less than three times a year to adopt major EC initiatives. This marked the establishment of the European Council.

February 28, 1975: The EC and 46 African, Caribbean, and Pacific (ACP) countries signed the Lomé Convention to replace both Yaoundé Conventions. The Lomé Convention gave virtually all products originating in the ACP countries free access to the EC market; it guaranteed these countries stable export earning from 36 commodities; and it provided for industrial and financial cooperation.

May 11, 1975: The Community entered into an agreement with Israel which provided for the removal or reduction of most customs duties on imports from Israel.

February 20, 1979: The European Court of Justice delivered its ruling in the Cassis de Dijon Case. The Court's dicta marked the birth of the principle of mutual recognition under which EC members must admit products from other member states as long as there is no valid concern for public health or safety.

March 10, 1979: The European Council meeting in Paris established the European Monetary System (EMS).

June 10, 1979: The first direct elections to the European Parliament were held. The new parliament had 410 members apportioned among the member countries. Overall turnout was 61%, ranging from 91.4% in Belgium to 32.6% in the UK.

October 31, 1979: The Community signed Lomé II with its then 58 ACP associates.

October 30, 1980: As a reaction to the crisis in the steel industry, the Council of Ministers unanimously approved the invocation of Article 58 of the ECSC Treaty. The Commission was granted power to lay down production quotas for each steel firm in the Community. This is seen as an example of how national governments increasingly use the EC as a means of implementing tough domestic policies.

January 1, 1981: Greece joined the Community boosting its membership to ten countries.

January 1, 1981: The ECU became the Community's unit of account.

January 25, 1983: After six years of negotiations the Council established a common EC fisheries policy. Virtually all of the Community's 200-mile zone was opened to all fishermen of the Community.

February 14, 1984: By 237 votes to 31 (with 43 abstentions) the European Parliament adopted a Treaty to establish the European Union, and transmitted it for further consideration to the parliaments and governments of the member countries.

February 28, 1984: The Council adopted the Esprit programme to assist Europe in research and development in the information technology sector.

June 17, 1984: The second direct elections to the European Parliament were held. Turnout averaged 60% throughout the Community, a decline of 2% from 1979.

December 8, 1984: The Community signed Lomé III with its then 65 ACP associates.

January 1, 1985: The first European Community passports were issued in member states.

June 14, 1985: The Commission transmitted to the Council its White Paper on the completion of the internal market by 1992, outlining approximately 300 laws which must be enacted for its realization. All physical, technical, fiscal, and social obstacles to trade within the Community are to be abolished.

January 1, 1986: Portugal and Spain joined the Community boosting its membership to twelve. The Community of Twelve had a population of 321 million (over 80 million larger than the U.S.) and accounted for 22% of world trade.

February 28, 1986: In the ten days ending on this date the twelve members signed the Single European Act which was a new institutional instrument amending the founding treaties of the European Communities. The Act was the brainchild of the Parliament and extended the use of qualified majority voting, extended the Treaty to cover monetary and environmental policy, and enhanced the Parliament's role in the Community decision-making process. Foreign policy coordination was also officially brought under the Treaty and the EPC was given a Secretariat.

June 30, 1987: At their summit the EC heads of government split 11 to 1 on the final communique. England's Prime Minister Thatcher refused to accept the document because it did not require a radical reorganization of the EC budget before additional funds were authorized.

July 1, 1987: The Single European Act, adopted in February 1986, comes into force among the twelve EC members.

January 1, 1988: A single customs declaration form was introduced throughout the Community, replacing the more than 100 forms previously used.

February 13, 1988: The Council of Ministers agreed on the most radical financial reforms in the EC's 30-year history. A big injection of cash is to put the EC on a sound financial footing for its drive toward 1992, with EC spending, however, capped at 1.3% of the EC's GNP. Development aid to depressed EC regions (Structural Fund) will be doubled by 1992, and they adopted an unprecedented system of automatic price cuts to penalize farmers who exceed production ceilings.

March 9, 1988: The European Parliament for the first time used its new power to veto trade agreements when it refused, with a large majority, to approve newly negotiated trade and financial protocols with Israel.

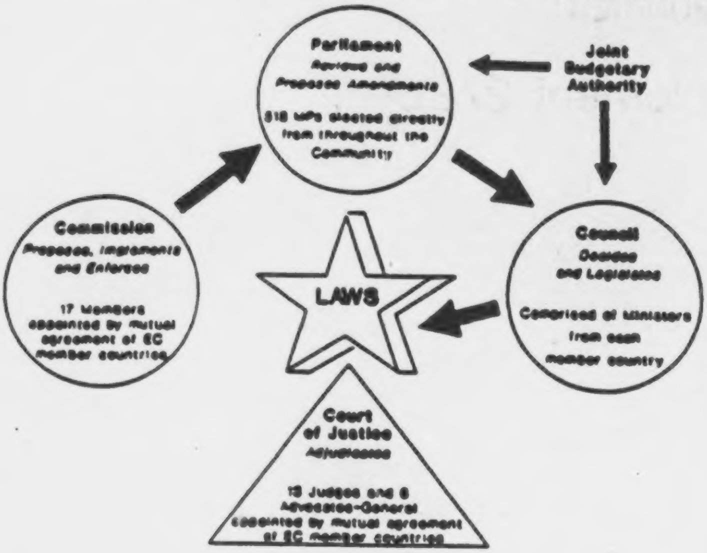
June 13, 1988: The EC finance ministers agreed on completely liberalizing capital movements inside the 12-member trading bloc by 1992. The new regulations give most member states two years to do away with laws and regulations that prohibit citizens from freely choosing banks or other financial services in any part of the EC. Greece, Ireland, Portugal, and Spain will be given until 1992 to bring their laws into compliance.

June 25, 1988: Representatives of the EC and the East Bloc's COMECON signed a joint declaration in Luxembourg establishing official diplomatic relations between the two organizations; until then the East Bloc had repeatedly refused to recognize the EC as a separate legal entity.

June 28, 1988: At the EC summit in Hannover the 12 heads of government agreed to establish a committee of experts to formulate "concrete stages" in the coming year for the realization of a European economic and currency union, perhaps with a European central bank. They also reaffirmed their intent to achieve the internal market by 1992 and committed themselves to pay close attention to the social costs of adjustment.

APPENDIX D

THE LEGISLATIVE PROCESS IN THE EUROPEAN COMMUNITY


Parliament
Reviews and
Proposes Amendments
518 MPs elected directly
from throughout the
Community
Joint
Budgetary
Authority
Commission
Proposes, Implements
and Enforces
17 Members
appointed by mutual
agreement of EC
member countries
LAWS
Council
Decides
and Legislates
Comprised of Ministers
from each
member country
Court
of Justice
Adjudicates
13 Judges and 6
Advocates-General
appointed by mutual agreement
of EC member countries

Commission: Members	Parliament: Members	Council: Votes
2 from France	81 from France	10 for France
2 from the F.R.G.	81 from the F.R.G.	10 for the F.R.G.
2 from Italy	81 from Italy	10 for Italy
2 from the U.K.	81 from the U.K.	10 for the U.K.
2 from Spain	60 from Spain	8 for Spain
1 from Netherlands	25 from Netherlands	5 for Netherlands
1 from Belgium	24 from Belgium	5 for Belgium
1 from Greece	24 from Greece	5 for Greece
1 from Portugal	24 from Portugal	5 for Portugal
1 from Denmark	16 from Denmark	3 for Denmark
1 from Ireland	15 from Ireland	3 for Ireland
1 from Luxembourg	6 from Luxembourg	2 for Luxembourg

Source: Adapted from a chart by the Commission of the European Communities.

APPENDIX E.

Bulletin
OF THE EUROPEAN
COMMUNITIES

Supplement 2/86

Single European Act

Commission
of the European Communities

TITLE III

Provisions on European cooperation in the sphere of foreign policy

Article 30

European Cooperation in the sphere of foreign policy shall be governed by the following provisions:

1. The High Contracting Parties, being members of the European Communities, shall endeavour jointly to formulate and implement a European foreign policy.

2. *(a)* The High Contracting Parties undertake to inform and consult each other on any foreign policy matters of general interest so as to ensure that their combined influence is exercised as effectively as possible through coordination, the convergence of their positions and the implementation of joint action.

(b) Consultations shall take place before the High Contracting Parties decide on their final position.

(c) In adopting its positions and in its national measures each High Contracting Party shall take full account of the positions of the other partners and shall give due consideration to the desirability of adopting and implementing common European positions.

In order to increase their capacity for joint action in the foreign policy field, the High Contracting Parties shall ensure that common principles and objectives are gradually developed and defined.

The determination of common positions shall constitute a point of reference for the policies of the High Contracting Parties.

(d) The High Contracting Parties shall endeavour to avoid any action or position which impairs their effectiveness as a cohesive force in international relations or within international organizations.

3. *(a)* The Ministers for Foreign Affairs and a member of the Commission shall meet at least four times a year within the framework of European Political Cooperation. They may also discuss foreign policy matters within the framework of Political Cooperation on the occasion of meetings of the Council of the European Communities.

(b) The Commission shall be fully associated with the proceedings of Political Cooperation.

(c) In order to ensure the swift adoption of common positions and the implementation of joint action, the High Contracting Parties shall, as far as possible, refrain from impeding the formation of a consensus and the joint action which this could produce.

4. The High Contracting Parties shall ensure that the European Parliament is closely associated with European Political Cooperation. To that end the Presidency shall regularly inform the European Parliament of the foreign policy issues which are being examined within the framework of Political Cooperation and shall ensure that the views of the European Parliament are duly taken into consideration.

5. The external policies of the European Community and the policies agreed in European Political Cooperation must be consistent.

The Presidency and the Commission, each within its own sphere of competence, shall have special responsibility for ensuring that such consistency is sought and maintained.

6. *(a)* The High Contracting Parties consider that closer cooperation on questions of European security would contribute in an essential way to the development of a European identity in external policy matters. They are ready to coordinate their positions more closely on the political and economic aspects of security.

(b) The High Contracting Parties are determined to maintain the technological and industrial conditions necessary for their security. They shall work to that end both at national level and, where appropriate, within the framework of the competent institutions and bodies.

(c) Nothing in this Title shall impede closer cooperation in the field of security between certain of the High Contracting Parties within the framework of the Western European Union or the Atlantic Alliance.

7. *(a)* In international institutions and at international conferences which they attend, the High Contracting Parties shall endeavour to adopt common positions on the subjects covered by this Title.

(b) In international institutions and at international conferences in which not all the High Contracting Parties participate, those who do participate shall take full account of positions agreed in European Political Cooperation.

8. The High Contracting Parties shall organize a political dialogue with third countries and regional groupings whenever they deem it necessary.

9. The High Contracting Parties and the Commission, through mutual assistance and information, shall intensify cooperation between their representations accredited to third countries and to international organizations.

10. (a) The Presidency of European Political Cooperation shall be held by the High Contracting Party which holds the Presidency of the Council of the European Communities.

(b) The Presidency shall be responsible for initiating action and coordinating and representing the positions of the Member States in relations with third countries in respect of European Political Cooperation activities. It shall also be responsible for the management of Political Cooperation and in particular for drawing up the timetable of meetings and for convening and organizing meetings.

(c) The Political Directors shall meet regularly in the Political Committee in order to give the necessary impetus, maintain the continuity of European Political Cooperation and prepare Ministers' discussions.

(d) The Political Committee or, if necessary, a ministerial meeting shall convene within forty-eight hours at the request of at least three Member States.

(e) The European Correspondents' Group shall be responsible, under the direction of the Political Committee, for monitoring the implementation of European Political Cooperation and for studying general organizational problems.

(f) Working groups shall meet as directed by the Political Committee.

(g) A Secretariat based in Brussels shall assist the Presidency in preparing and implementing the activities of European Political Cooperation and in administrative matters. It shall carry out its duties under the authority of the Presidency.

11. As regards privileges and immunities, the members of the European Political Cooperation Secretariat shall be treated in the same way as members of the diplomatic missions of the High Contracting Parties based in the same place as the Secretariat.

12. Five years after the entry into force of this Act the High Contracting Parties shall examine whether any revision of Title III is required.

APPENDIX F
PARTY GROUPINGS IN THE PARLIAMENT OF THE EUROPEAN COMMUNITY*

SOCIALIST GROUP (S) [172]

Belgium	Parti socialiste (PS) Socialistische Partij (SP)
Denmark	Socialdemokratiet (S)
Germany, West	Sozialdemokratische Partei Deutschlands (SPD)
Greece	PASOK
France	Parti socialiste (PS)
Italy	Partito socialista democratico italiano (PSDI) Partito socialista italiano (PSI)
Luxembourg	Parti ouvrier socialiste luxembourgeois (POSL)
Netherlands	Partij van de Arbeid (Pvd A)
Portugal	Partido Socialista
Spain	Partido Socialista Obrero Espanol (PSOE)
United Kingdom	Labour Party Social Democratic and Labour Party (SDLP)

GROUP OF THE EUROPEAN PEOPLE'S PARTY (PPE) [117]

Belgium	Christelijke Volkspartij (CVP) Parti social chretien (PSC)
France	Centre des Democrates sociaux (CDS)
Germany, West	Christlich Demokratische Union (CDU) Christlich Soziale Union (CSU)
Greece	Nea Dimokratia (ND)
Ireland	Fine Gael (FG)
Italy	Democrazia Cristiana (DC)

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*Showing Seats held as of May 1987 in [], out of a total of 518.

	Sudtiroler Volkspartei (SV)
Luxembourg	Parti chretien social (PCS)
Netherlands	Christen Democratisch Appel (CDA)
Portugal	Centro Democratico Social (CDS)
Spain	Partido Democratica Popular (PDP) Partido Nacionalista Vasco (PNV) Unio Democratica de Catalunya (UDC)

EUROPEAN DEMOCRATIC GROUP (ED) [63]

Denmark	Det Konservatieve Folkeparti (KF)
United Kingdom	Conservative and Unionist Party (Cons)

COMMUNIST AND ALLIES GROUP (COM) [46]

Denmark	Socialistik Folkeparti (SF)
France	Parti communiste francais (PCF)
Greece	KKE KKE Inter.
Italy	Partito communista italiano (PCI) Indipendenti di Sinistra (Indsin)

LIBERALS AND DEMOCRATIC REFORMIST GROUP (LDR) [42]

Belgium	Parti reformateur liberal (PRL) Partij voor Vrijheid en Vooruitgang (PVV)
Denmark	Venstre Danmarks Liberal Parti
France	Parti radical socialiste (PRS) Parti republicain (PR)
Germany, West	Freie Demokratische Partei (FDP)
Italy	Partito liberale italiano (PLI) Partito repubblicano italiano (PRI)
Luxembourg	Demokratische Partei (DP)
Netherlands	Volkspartij voor Vrijheid en Democratie (VVD)

Portugal	Partido Social-Democrata (PSD)
Spain	Convergencia Democratica de Catalunya (CDC) Partido Reformista/Democratico
United Kingdom	Liberal Party

EUROPEAN RENEWAL AND DEMOCRATIC ALLIANCE (RDE) [34]

France	Rassemblement pour la republique (RPR)
Ireland	Fianna Fail Party (FF)
United Kingdom	Scottish National Party (SNP)

RAINBOW GROUP (ARC) [20]

Belgium	Agalev Ecolo Volksunie (VU)
Denmark	Folkebevaegelsen mod EF
Germany, West	Die Gruenen
Italy	Democrazia proletaria Partito Sardo d'Azione
Netherlands	Groen-Professief Akkoord
Spain	Euskadiko Ezkerra

GROUP OF THE EUROPEAN RIGHT (DR) [17]

France	Front national (FN)
Greece	Ethniki Politiki Enossis (EPEN)
Italy	Movimento sociale italiano

Source: Yearbook of the European Communities (7th Ed.), Brussels: Editions Delta. 1987. pp. 77-85.

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CRS REPORT FOR CONGRESS

THE EUROPEAN COMMUNITY'S 1992 PLAN: AN OVERVIEW OF THE PROPOSED 'SINGLE MARKET'

The European Community is attempting to unify the diverse national economies of its member states into one large pan-European economy by 1992. If the plan succeeds, the main barriers to trade within the European Community will have been eliminated. The 1992 plan is already well underway. The implications of this truly common market are not yet fully apparent. This report examines the basic elements of the 1992 plan and the possible implications for the United States.

by
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September 21, 1988

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THE EUROPEAN COMMUNITY'S 1992 PLAN: AN OVERVIEW OF THE PROPOSED 'SINGLE MARKET'

SUMMARY

In 1985, the Commission of the European Communities (EC Commission) issued a White Paper entitled, Completing the Internal Market. That document provided a road map for the integration of the economies of the twelve member states into one of the world's largest economies. The leaders of the European Community (EC) member states, through the unanimous ratification of the Single European Act in 1987, provided the political authority necessary to get the process of economic integration underway.

The 1992 Plan is as simple as it is subtle. The plan comprises nearly 300 recommendations, or directives, for new laws and regulations that will eliminate nearly all of the barriers that affect the intra-European movement of goods, services, and people. The European Community is adopting the directives one-by-one. Although some are more controversial than others, most should be approved by the 1992 deadline. By August 1988, fully one-third of the total had already been adopted, and another 100 were under consideration.

Three major types of barriers to intra-European trade will be eliminated: physical (or frontier) barriers, technical barriers, and fiscal (tax) barriers. The EC Commission has projected that the elimination of these impediments to trade will result in economic benefits of more than $200 billion in the medium-term, in addition to creating some 5 million new jobs and boosting gross domestic product (GDP) by 7 percent. Other economic forecasters are less sanguine about the program, projecting only a 0.5 percent increase in GDP by 1995.

The European Community's major trading partners may be confronted with new economic challenges and opportunities as unification proceeds. While prospects for market expansion based on increasing integration appear promising for U.S. exporters and investors, the European Community has not yet clearly spelled out the ways in which the 1992 plan will affect non-EC trading partners. Between now and 1992, the U.S. Government and private businesses will have to pay attention to the deliberations in the European Community on the issue of economic unification. The EC is the United States' largest trading partner, and the decisions that are made in Brussels and Strasbourg (respectively the homes of the EC Commission and the European Parliament) will be felt in the United States.

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THE EUROPEAN COMMUNITY'S 1992 PLAN: AN OVERVIEW OF THE PROPOSED 'SINGLE MARKET' [1]

> Europe stands at the crossroads. We either go ahead - with resolution and determination - or we drop back into mediocrity. We can now either resolve to complete the integration of the economies of Europe; or, through a lack of political will to face the immense problems involved, we can simply allow Europe to develop into no more than a free trade area. [2]

In 1492, Europeans began an odyssey of economic expansion as they sought to discover new routes to foreign markets. Five hundred years later, a united Europe has set out on another journey. By December 31, 1992, the European Community (referred to in this report as the Community or the EC) proposes abolishing all internal barriers to trade, commerce, and movement between the member states. [3] Unlike Columbus's voyage of overseas discovery, the Europeans of 1992 will seek to discover the benefits of developing a vast internal market.

Although a period of half a millennium separates these two events, both represent milestones in European economic development. The program to integrate the European marketplace into a single economy represents a newfound determination on the part of the EC-member states to achieve the goals adopted in the 1958 Treaty of Rome. The purpose of this report is to discuss the 1992 unification of the European marketplace, its potential significance, and its implications for the United States. The major features of the so-called 'single market' or '1992' plan which will be implemented gradually during the next few years will be examined.

THE UNIFICATION OF THE EUROPEAN MARKET: THE AMBITIONS OF THE 1992 PLAN

The 1992 plan represents an ambitious attempt by the European Community and its member states to develop a single coherent and cohesive European marketplace free from internal barriers. The 1992 plan was introduced in 1985 with the publication by the Commission of the European Communities

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[1] Unless otherwise specified, the terms "Europe" or "European" refer to the European Community and its member countries.

[2] Commission of the European Communities. Completing the Internal Market. White Paper from the Commission to the European Council/EC Commission. 1985. p. 55.

[3] The 12 member states of the European Community are: Belgium, Denmark, France, Federal Republic of Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Spain, and the United Kingdom.

(EC Commission) [4] of a White Paper entitled Completing the Internal Market. Although the plan generated little fanfare until recently, the EC Commission has been active in promoting it during 1988, and the plan has recently become a focus of attention in Europe, as well as in the rest of the world. The White Paper laid out a strategy for achieving the type of integration originally envisioned in the Treaty of Rome (also known as the EEC Treaty) that established the European Economic Community in 1957.

Subsequent to the publication of the White Paper, the European Community adopted the Single European Act (SEA) in February 1986 and ratified it in July 1987. The SEA contains a number of amendments to the EEC Treaty which call for the Community to "adopt measures with the aim of progressively establishing the internal market over a period expiring on 31 December 1992... The internal market shall comprise an area without internal frontiers in which the free movement of goods, persons, services, and capital is ensured in accordance with the provisions of this Treaty." [5]

The adoption of the SEA was a logical and necessary step for adopting the various measures proposed in the White Paper. One significant change designed to facilitate implementation of the White Paper was the elimination of a requirement that decisionmaking be unanimous in favor of approval by 'qualified majorities' with respect to measures concerning the internal market.

In February 1988, an agreement was reached at the EC summit meeting in Brussels to reform Community finances. This agreement may have resolved a major barrier to increased economic integration by providing the EC Commission with a budget that is large enough to carry out the 1992 program. More significantly, the Brussels summit eliminated the budget issue as a major point of contention among member states and demonstrated a continuing commitment to the goals of the EEC Treaty. Referring to the results of the Brussels summit, Roy Denman, the head of the EC delegation to the United States, said, "The Community can now lift its sights to its manifest destiny." [6]

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[4] The EC Commission is responsible for formulating and proposing legislation and providing for the administration of Community policies. Seventeen Commissioners (two each from France, the Federal Republic of Germany, Italy, Spain, and the United Kingdom and one from each of the other member states) serve the Community rather than their particular countries.

[5] Article 8 A, Single European Act.

[6] Denman, Roy. A Letter From Europe, A monthly update of the European Community from its Delegation in Washington, no. 48, February 25, 1988.

A TRUE COMMON MARKET: ELIMINATING INTERNAL BARRIERS

The main thrust of the 1992 initiative is the creation of a true common market in which all non-tariff barriers and other impediments to commerce are eliminated.[7] The goal is "the creation of a completely integrated Community-wide economy."[8] Such an economy would integrate 12 separate markets into one large market of 320 million people. The European Commission has identified the major problems associated with the fragmentation of Europe into multiple markets with disparate regulations and policies:

(1) high administrative costs incurred in dealing with different national bureaucratic requirements;

(2) higher transport costs because of formalities at borders;

(3) increased costs as a result of having to apply different national standards and so having smaller product runs;

(4) duplication of costs involved in separate research and development;

(5) the high costs of non-competitive and heavily regulated State activities, as exemplified by national public procurement policies;

(6) and, ultimately, high costs and reduced choice for the consumer confined to his national market; combined with

(7) the opportunity cost which prevents or at best discourages economic activity from spreading across frontiers to enjoy the full market potential.[9]

In the view of the EC Commission, a united Europe would be much more competitive internationally and would be able to realize significant economies of scale, higher productivity, and increased innovation associated with the potentially vast European marketplace:

> The reason for getting rid entirely of physical and other controls between Member States is not one of theology or appearance, but the hard practical fact that the maintenance of any internal frontier controls will perpetuate the costs and disadvantages of a divided market; the more the need for such controls diminishes -- short of total elimination-- the more disproportionate become the costs, expenses and

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[7] Tariffs between member countries of the EC were abolished during the early 1960s.

[8] EC Commission. Europe Without Frontiers -- Completing the Internal Market. European Documentation Series - 4/1987. Luxembourg, Office for Official Publications of the European Commission.

[9] European Commission, Europe Without Frontiers, p. 12.

disadvantages of maintaining the frontiers and a divided market.[10]

The 1985 White Paper proposed a step-by-step approach to the removal of three major types of internal barriers to commercial activity: physical barriers, technical barriers, and fiscal barriers. The 1992 Plan will affect nearly every sphere of European economic life. Customs barriers and other physical limitations to free movement are to be abolished. The harmonization of technical standards will provide a boost to the expansion of trade in goods and services within Europe. The EC is expected to adopt standards for products that are currently regulated by each individual member state for health and safety, environmental protection, or consumer protection reasons. Barriers to trade in services will be placed on a basis of mutual recognition and equivalence.[11] Finally, fiscal barriers are to be eliminated by harmonizing indirect taxes. In all, the EC is to issue approximately 285 regulations to create the internal market.[12]

Physical barriers

Immigration and customs (or, more specifically, tax) controls represent the major visible barriers to the creation of a single European economy. The 1992 Plan envisions 'a Europe without frontiers' where people and goods can freely move from one country to the next without hindrance or delay. In 1957, the EC Treaty abolished tariffs and quantitative restrictions for intra-Community trade. However, other non-tariff barriers have proved to be persistent and costly, imposing burdens on industry through border formalities, transportation, and handling charges for goods that are shipped from one member state to another. Rather than attempting to simplify existing procedures, the EC Commission proposes abolishing all frontier controls between member states.[13] Although internal frontier borders will be eliminated, goods and people entering the EC will continue to be subject to customs and immigration controls.

People. European Community nationals are to be free to travel from one member state to another under the 1992 Plan. All frontier controls are to be abolished in stages, and Community citizens are to bear a European Community passport. Immigration, security, and tax policies are to be coordinated among member states to eliminate intra-EC border delays.

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[10] EC Commission, Completing the Internal Market, p. 6.

[11] EC Commission, Completing the Internal Market, p. 6.

[12] As of August 1988, the Commission had drafted approximately 200 directives, and the European Council had approved nearly half of those (or about one-third of the total).

[13] EC Commission, Completing the Internal Market, p. 9; EC Commission, Europe Without Frontiers, p. 29.

The elimination of internal border controls will lead to tighter external border controls. A common policy will be developed to deal with problems related to national security, such as crime, drugs, terrorism, and firearms. Policies affecting third-country citizens will also be implemented.

Goods. The EC is a customs union; a common tariff policy provided a major impetus to the formation of the common market in 1957. Non-tariff-related frontier formalities, however, have proved to be a major obstacle to the realization of an integrated economy. The paperwork involved in moving goods across national borders takes many forms and represents the spectrum of non-tariff barriers to trade, including tax collection, statistics collection, export and import licensing restrictions, trade quota enforcement, plant and animal disease control, and control of banned products, among others.[14]

Transportation. Transportation between European countries is heavily regulated. Transport quotas limit the number of trips that transporters are allowed to make. Under the 1992 Plan, a gradual relaxation of transport quotas will be necessary if frontier controls are to be abolished. The EC Commission has recommended the development of a common transport policy to allow transport firms to operate freely throughout the EC.

Technical barriers

Technical barriers are among the most complex impediments to the development of a single European economy. Technical barriers are not visible in the way that frontier barriers are. However, they are frequently as disruptive to trade and add considerable cost to doing business across borders.

Technical barriers are the product of national product regulation and standards. They are imposed to protect health, safety, and the environment. Because national standards and regulations vary greatly, product specifications must be altered to conform with the differing requirements imposed in each national market.

The objective of the 1992 Plan is to replace national standards with European standards. The principles for achieving common standards were established by the EC Commission in its 1985 White Paper:

> (1) A clear distinction needs to be drawn in future internal market initiatives between what it is essential to harmonize, and what may be left to mutual recognition of national regulations and standards; this implies that, on the occasion of each harmonization initiative, the Commission will determine whether national regulations are excessive in relation to the mandatory requirements pursued and, thus, constitute unjustified barriers to trade according to Article 30 to 36 of the EEC Treaty;

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[14] EC Commission, Europe Without Frontiers, p. 34.

(2) Legislative harmonization (Council Directives based on Article 100) will in future be restricted to laying down essential health and safety requirements which will be obligatory in all member states. Conformity with this will entitle a product to free movement;

(3) Harmonization of industrial standards by the elaboration of European standards will be promoted to the maximum extent, but the absence of European Standards should not be allowed to be used as a barrier to free movement. During the waiting period while European Standards are being developed, the mutual acceptance of national standards, with agreed procedures, should be the guiding principle.[15]

These three principles have, as their goal, the promotion of free trade among European countries. Harmonization of standards is to be complemented with mutual recognition of national standards and regulations. Thus, products that meet health and safety standards in one country should be allowed into other European countries. The EC Commission position is that, "In a nutshell, if a product is fit to trade, it should be free to trade."[16]

The Commission's intent is to weed out regulations that restrict trade in goods and services for other than legitimate health and safety reasons. Technical barriers that are primarily exclusionary in intent would no longer be allowed if the 1992 Plan is successfully implemented. A number of advantages would accrue to consumers, to manufacturers, and to providers of services within Europe. Product standards would no longer block innovation; companies would achieve greater economies of scale in manufacturing because insignificant changes would no longer have to be made to products to make them acceptable in the markets of other member states; and consumers would have a wider range of choices in products and services.

Technical barriers are addressed in many of the 285 directives that must be adopted before the 1992 Plan becomes a reality. The directives will take the form of regulations. In broad terms, elimination of technical barriers are proposed to be achieved through:

(1) Harmonization of standards, testing, and certification of a wide range of products (see Chart A-1 in Appendix A);

(2) New rules for harmonizing packaging, labelling, and processing requirements (see Chart A-2 in Appendix A);

(3) Harmonization of regulations for the health industry (including marketing);

(4) Changes in government procurement regulations, including:

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[15] EC Commission, Completing the Internal Market, p. 19.

[16] EC Commission, Europe Without Frontiers, p. 40.

-- coordination of procedures on the award of public works and supply contracts;
-- extension of EC law to the transport, energy, water, and telecommunications sectors;
-- services;

(5) Harmonization of regulations for the services sector (see Chart A-3 in Appendix A for a list of the affected industries);

(6) Liberalization of capital movements;

(7) Consumer protection regulations;

(8) Harmonization of laws regulating company behavior (including mergers and acquisitions, trademarks, copyrights, cross-border mergers, bankruptcy, etc.);

(9) Harmonization of rules pertaining to the free movement of labor and the professions within the EC (See Chart A-4 in Appendix A).[17]

Some of the most important elements of the 1992 Plan are to be achieved through the elimination of technical barriers to services. The services sector includes financial services, broadcasting, information technology (IT)-related services, and transport services. Cross-border obstacles to business activities will also be reduced through the elimination of some legal and administrative barriers.

The success or failure of the 1992 Plan will depend to a great extent on the elimination of the technical barriers that currently divide Europe into 12 separate markets. Those industries in which technological innovation is most rapid should benefit in significant ways from harmonization. The ability to introduce new technologies or to incorporate the latest technical advances into products without fear of new barriers should provide a substantial inducement to companies operating in Europe.

Fiscal barriers

Fiscal barriers represent the third major structural impediment to the creation of a single European economy. Each of the member countries of the EC has its own system of taxation, which, in turn, requires fiscal frontier controls for collection and enforcement of taxes (i.e., value-added tax (VAT) and excise duties). Each of the member states sets its own rates in accordance with its national tax/revenue system. This means that overall rates vary quite substantially and that similar goods are treated differently in each country. For example, in January 1988, the standard VAT rate ranged from 12 percent in Spain and Luxembourg to 25 percent in Ireland. Furthermore, some countries do not tax specific goods at the same rate that others charge. Britain, for instance, has no tax on food, children's clothes, or books.[18]

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[17] For a discussion of the EC's Internal Market Program, see: Lamoriello, Francine. Completing the Internal Market by 1992: The EC's Legislative Program for Business. Business America, August 1, 1988. p. 4-7. A concise discussion of harmonization efforts by the EC is to be found in the same issue of Business America (p. 9-8).

The EC's 1985 White Paper calls for a narrowing of the range of tax rates, with high-tax countries reducing their rates and low-tax countries charging higher rates. Instead of having frontier collection points, taxes would be collected through a clearing system similar to a bank clearing system. Fiscal barriers have been widely regarded as one of the most difficult aspects of the 1992 Plan. In its survey of the European internal market plan, the Economist (London) declared, "All in all, the way things are going at the moment, it is most improbable that 1992 will bring even the prospect of frontiers without tax checks."[19]

The real question for the individual member states of the EC is whether they are ready to cede a large portion of their fiscal sovereignty to the European Community in Brussels. The question of taxes is an important issue within Europe for reasons of symbolism (elimination of all border controls) and efficiency (border controls are expensive to maintain and impose an additional transaction cost on goods in terms of delays.) The failure of the EC to achieve harmony in this area may impede the completion of the internal market.

THE ANTICIPATED BENEFITS OF INTEGRATION: THE EC COMMISSION'S VIEW

The Single Market Plan will, according to many analysts, result in the realization of significant economic benefits for the European Community and its member nations. The EC Commission projects that the elimination of physical, technical, and fiscal barriers will result in (1) a medium-term economic gain throughout the EC of $212 billion to $312 billion,[20] or 4.25 to 6.5 percent of the EC's gross domestic product (GDP); (2) the creation of as many as 2 million new jobs; and (3) consumer prices that are 6 percent lower than they would have been without market integration.[21]

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[18] EC Commission. Europe Without Frontiers, p. 47-53; Buchan, David. The Quest for Tax Harmony. Financial Times, August 22, 1988. p. 12.

[19] Europe's Internal Market: A Survey. The Economist, July 9, 1988. p. 12.

[20] All figures are expressed in dollars rather than European Currency Units (ECU's). 1 ECU was equivalent to approximately $1.25 dollars on March 31, 1988. The total medium-term economic benefits include all of the gains -- direct and indirect -- that might be realized from the creation of a single market.

[21] A 'Europe Without Borders' in 1992: The Economic Impact. European Community News, no. 9/88, April 13, 1988.

The EC Commission has published data on the potential gains that might be realized by the member states.[22] The elimination of barriers is expected to yield direct economic benefits amounting to $81 billion to $100 billion (2.2 to 2.7 percent of GDP), and indirect benefits of $78 billion to $104 billion. The indirect benefits of market integration include gains from exploiting economies of scale more fully and gains from intensified competition.[23] Table 1 presents EC Commission 'medium-term' estimates of the potential economic gains resulting from full implementation of the 1992 Plan.

The direct benefits from removing the barriers identified in the 1992 Plan will produce somewhat less than half of the total economic benefits that the Commission expects to be achieved in the medium term. Thus, the removal of internal trade barriers is key to the 1992 Plan, but it is not expected to raise GDP by more than 2.2 to 2.7 percent at best. The removal of intra-European barriers is expected to generate a new competitive dynamic within the single market that is related to economies of scale, greater efficiency or a reduction of monopoly rents and profits. The EC Commission estimates that these indirect benefits realized through market integration will raise GDP by 2.1 percent to 3.7 percent.[24]

Increased internal competition, economies of scale, and, for member governments, much more highly coordinated macroeconomic policies, are essential for the realization of the full benefits of the plan.[25] According to the EC Commission, the sum of the various factors will potentially generate benefits amounting to a 7 percent increase in GDP, 5 million new jobs, and a 4.5 percent decrease in consumer prices. (See Table 2.) The main conclusion of the Commission's The Economics of 1992 is that the completion of the internal market will, if implemented with speed and conviction, transform the European Community's macroeconomic performance from mediocre to satisfactory. The Commission has noted:

> Implementation of half of the actions proposed in the White Paper will deliver much less than half of the total potential benefits. In fact, more than full implementation of the White Paper is required in order to achieve the full potential benefits of an integrated European market. There

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[22] EC estimates for market integration are based on data for 7 member states (Germany, France, Italy, United Kingdom, Belgium, the Netherlands, and Luxembourg) and are expressed in 1985 prices.

[23] Commission of the European Communities. Directorate-General for Economic and Financial Affairs. The Economics of 1992: An Assessment of the Potential Economic Effects of Completing the Internal Market of the European Community. European Economy, no. 35, March 1988. 220 p.; Cecchini, Paolo. Study Analyzes Impact of 1992 Internal Market: Elimination of Barriers will Set in Motion a Complex Chain of Events. Europe, May 1988. p. 18.

[24] EC Commission. The Economics of 1992, p. 151-157.

[25] A 'Europe Without Borders' in 1992, April 13, 1988.

must be a strong competition policy, which was discussed only in very summary terms in the White Paper. Macroeconomic policy has to be set on a coherent, growth-oriented strategy. The White Paper represents a policy aimed at making the supply potential of the Community economy more flexible and competitive. The counterpart in terms of the demand side needs to be clearly agreed among policy-makers and credibly communicated to business and public opinion. In normal cyclical conditions it would be appropriate, as soon as sufficient market actions are beginning to be implemented, for macroeconomic policy to ratify these measures by ensuring that the economy climbs onto the higher growth trajectory. But in the actual business climate of 1988, such steps should not be delayed. [26]

TABLE 1. Potential Benefits of the 1992 Plan: EC Commission Projections

	$ billions	GDP(%)
Gains from removal of barriers affecting trade	10-11	0.2-0.3
Gains from removal of barriers affecting overall production	71-89	2.0-2.4
Gains from removing barriers (subtotal)	81-100	2.2-2.7
Gains from exploiting economies of scale more fully	75	2.1
Gains from intensified competition reducing business ineffectiveness and monopoly profits	58	1.6
Gains from market integration (subtotal)	78-134	2.1-3.7
TOTAL GAINS		
- for 7 member states at 1985 prices	159-234	4.3-6.5
- for 12 member states at 1988 prices	213-313	4.3-6.5

All figures except in the last line are expressed in 1985 prices and relate to 7 member states. The aggregate result is scaled up in terms of the 12 member states' 1988 GDP in the last line. All figures have been converted to U.S. dollars at a rate of 1 ECU = $1.25.

Source: EC Commission. A 'Europe Without Borders' in 1992. European Community News, no. 9/88, April 13, 1988. p. 5

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[26] EC Commission, The Economics of 1992, p. 22.

TABLE 2. Macroeconomic Consequences of Completion of the Internal Market Accompanied by Economic Policy Measures

	Percent of GDP	Consumer Prices	Employment (x 1,000)	Gov't Deficit (% of GDP)	External Balance (% of GDP)
Internal Market Measures					
Frontier Controls	0.4	-1.0	200	0.2	0.2
Public Procurement	0.5	-1.4	350	0.3	0.1
Financial Services	1.5	-1.4	400	1.1	0.3
Supply Effects	2.1	-2.3	850	0.6	0.4
TOTAL					
Average	4.5	-6.1	1,800	2.2	1.0
Range	3.2 to 5.7	-4.5 to -7.7	1,300 to 2,300	1.5 to 3.0	0.7 to 1.3
Accompanying Economic Policy Measures 1/					
Public Finance	7.5	-4.3	5,700	0	-0.5
External Position	6.5	-4.9	4,400	0.7	0
Disinflation	7.0	-4.5	5,000	0.4	-0.2

1/ Margin of error = plus or minus 30 percent

Source: EC Commission. The Economics of 1992. European Economy, no. 35 (March 1988), p. 159, 165.

Thus, the Commission has recently urged quick action that extends well beyond the program introduced in the 1985 White Paper. The gains from eliminating non-tariff barriers will have to be closely linked with increased coordination by the governments of the various member states. The autonomy and sovereignty of the member states potentially will be reduced to the extent that a single European economy determines policy options.

ACHIEVING AN EC-WIDE CONSENSUS: PROSPECTS AND PROBLEMS

Given the political difficulties involved in reducing fiscal barriers (discussed above), what are the prospects for developing a consensus on macroeconomic policy and achieving the much closer coordination required to make the 1992 Plan work as proposed? Along with the development of a consensus on tax policy, it may be several years before the degree of coordination envisaged by the EC Commission is reached. The question is primarily political, although the potential benefits will be mainly economic.

If European leaders decide that 12 different national economic policies no longer make as much sense in a Europe-wide economy, increased coordination may be achieved. However, if one or more countries successfully fend off the EC Commission's drive to widen integration beyond internal barriers, or if a recession sets in before 1992, the plan for an internal market may falter. If, on the other hand, businesses in Europe do become more competitive and efficient, there is a strong probability that they will offer the support necessary to influence national economic policymakers toward a consensus on those difficult issues that threaten the successful implementation of the plan. The recent wave of cross-border mergers and acquisitions suggest that businesses are preparing to take a European, rather than a parochial, approach to competition. It is possible that the 1992 Plan will succeed more on the basis of what it offers for business than for any perceived benefits or disadvantages that may accrue to individual European nations.

There is another element to the 1992 Plan that may yet produce a negative political reaction to the plan. The short-term consequences of implementing all of the proposed directives for completing the internal market will likely be increased unemployment in the short-term and possibly a painful readjustment for some businesses that are less productive, less efficient, or more highly protected.

The EC Commission has estimated that job losses during the first years of the plan may amount to 250,000 per year (or more than 550,000 jobs) as a result of a reduction in public and private employment. One possible risk to the internal market plan is that so-called "Euro-euphoria" over 1992 may blind many Europeans to the seemingly harsh short-term implications of the plan and thus contribute to a backlash that would lead national governments to attempt to protect domestic industries from the competitive environment that 1992 is supposed to foster. If the EC Commission is correct in its assessment of the short-term consequences, the member states might do well to devise an adjustment program to assist marginal firms and dislocated workers within the context of the 1992 Plan.

A recent study by Data Resources Inc., an economic forecasting firm, takes a somewhat more pessimistic view of the results of the 1992 Plan.[27] DRI rejects the assumption by the Commission that all of the proposed changes will be in place by 1992, arguing that the EC is unlikely to achieve fiscal harmonization and may not be able to remove all of the technical barriers by the target date. The DRI study concludes that the macroeconomic impacts of the plan will amount to a 0.5 percent increase in GDP and 300,000 additional jobs by 1995. It should be emphasized that DRI is predicting the most likely outcome rather than the greatest possible benefits that might eventually accrue. Nevertheless, the DRI estimate still falls well below EC Commission projections.

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[27] DRI Europe Inc. 1992: A United Europe, by Geoff Horton and Elisabeth Waelbroeck-Rocha. European Long-Term Review. April 1988. p. 11-17. See also: Domsimoni, Marie-Paul, and Elizabeth Rocha, and Stan Standaert. Letters to the Editor. A Not So Gilded Vision of 1992. Financial Times, April 12, 1988. p. 29.

EUROPEAN COMMUNITY TRADE

If the concept of 1992 has any meaning at all, it is that the 12 member states' economies will be fused into one very large economy that will constitute one of the world's largest trading blocs. A brief discussion of the dimensions of such a unified European economy within the global context will demonstrate the importance of 1992. The implications of 1992 for the United States will be outlined in the following section.

In 1987, the European Community had 323 million inhabitants, making it potentially the largest market in the world. The United States and Japan, respectively, had 244 million and 122 million inhabitants. The EC had a 1987 GDP of $4,586 billion, while the United States' GDP was $4,870 billion, and that of Japan amounted to $2,572 billion.[28]

In 1987, the EC accounted for 40 percent of total world trade, compared with 14 percent for the United States, and 8 percent for Japan.[29] The European Community's main trading partners -- the European Free Trade Association (EFTA)[30] and the United States -- accounted for about 44 percent of EC trade (this figure excludes intra-EC trade (i.e., trade exclusively among EC-member countries)) in 1987.[31]

Not only is the EC potentially the largest market in the world, it was, in 1987, the largest single trading partner of the United States. During the 1980s, the U.S. merchandise trade balance deteriorated markedly. The Commerce Department has reported that the magnitude of deterioration amounted to $36 billion between 1980 and 1987 and that large surpluses have been replaced by deficits. Tables 3 through 5 present data on EC trade; table 6 contains information on U.S.-EC trade in selected commodities for 1986 and 1987; and charts 1 through 3 illustrate not only the magnitude of the EC marketplace, but also the importance of the European market to the United States. Chart 4 shows the deterioration of the merchandise trade balance with the EC from 1981 to 1987.

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[28] European Economy, no. 34, November 1987. p. 125.

[29] Trade among EC member countries accounts for approximately 57 percent of total EC trade. Trade with countries outside the EC accounts for approximately 43 percent of all EC trade. EC trade with non-EC member countries accounts for approximately 17 percent of world trade. Figures derived from International Monetary Fund. Direction of Trade Statistics. 1988 Yearbook; European Economy. No. 34. November 1987. p. 142; and EC Commission. The External Trade of the European Community. European File 1/97. January 1987. p. 3.

[30] The members of EFTA are Norway, Sweden, Finland, Iceland, Austria, and Switzerland.

[31] The bulk of EC trade is among member states. For 1987, OECD data indicate that 59 percent of total EC trade was internal. OECD. Monthly Statistics of Foreign Trade. June 1988.

FOREIGN TRADE: THE 1992 PLAN'S MISSING ELEMENT

The most controversial aspect of the 1992 Plan from the point of non-Europeans is the omission of any discussion of the extra-European effects of the plan. Although the Commission has completed detailed studies of nearly every aspect of the plan and has developed extensive projections of the consequences of eliminating intra-EC barriers, no similar effort has been made with respect to Europe's main trading partners. This apparent silence on the part of the Commission has caused considerable speculation about the long-term consequences of the 1992 Plan for non-EC countries and has created a concern that the development of the internal market will lead to a "fortress Europe" that is no longer open to foreign trade and investment.

There is a clear risk that those barriers that now exist throughout Europe will be dismantled internally only to be redeployed around the perimeter of the European Community as protectionist pressures mount in those sectors or regions where competition is most intense. Although the EC Commission has attempted ~~to allay fears~~ of a "fortress Europe," it has taken no concrete actions that demonstrate a firm resolve to an open world trading system. U.S. interests in maintaining close economic ties to Europe have been emphatically and repeatedly stressed by the Reagan Administration.[32]

There appears to be considerable fear that the internal market may provide the European Community with an excuse for redefining the rules of trade to its own advantage. Whether this fear is well founded is open to speculation, but controversy will undoubtedly continue over the single market plan as Europeans and their trade partners attempt to come to terms with the new opportunities that will be created. There are several possible explanations for why the EC Commission has so far not attempted to deal with the external implications of its plan.

One explanation is that the plan is controversial enough within Europe that any attempt to come to terms with how the EC will function in the world economy would slow progress toward the major goals of the 1992 Plan. Every time an EC country eliminates an internal barrier, it loses some advantage that it previously had. Protected industries and disadvantaged regions will be the main victims, even if there is an overall gain in the economic welfare of the Community as a whole. To some extent, it will be in the interest of individual member countries to push for continued barriers at a Community-wide level if these are to be eliminated at the national level. If the EC Commission announced that it had no intention of seeing Community-wide barriers put into place, opposition to the plan might build rapidly.

Another possible explanation for the omission of external effects is that there is no existing consensus on the difficult decisions that

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[32] See United States Department of State. The European Community's Program to Complete a Single Market by 1992. July 5, 1988. 18 p., and United States Department of the Treasury. Remarks by M. Peter McPherson, Deputy Secretary of the Treasury, to the Institute for International Economics. Washington, August 4, 1988. 7 p.

TABLE 3. European Community Trade, 1986-87
(in billions of dollars)

	Imports		Exports		Balance	
	1986	1987	1986	1987	1986	1987
Intra-EEC Trade	444.4	550.5	450.6	546.0	--	--
EFTA	77.3	95.3	85.6	97.4	8.1	2.1
United States	57.0	66.4	73.6	80.8	16.6	14.4
Japan	45.8	42.1	11.3	14.7	-34.5	-27.4
Canada	6.5	8.0	9.0	10.2	2.5	2.2
OPEC	37.8	40.2	34.6	33.7	-3.1	-6.5
COMECON(Total)	25.0	28.4	20.6	22.3	-4.4	-6.0
COMECON(Europe)	24.6	28.0	19.3	21.8	-4.8	-6.2
Africa	39.8	41.4	36.5	37.7	-3.3	-3.7
South Africa	5.8	5.6	4.6	5.8	-1.2	0.2
Latin America	20.2	22.4	14.3	15.8	-5.9	-6.6
Middle East	21.9	24.7	28.6	28.8	6.7	4.0
Far East	33.2	46.1	32.6	39.0	-0.6	-7.1
S. Korea	4.5	6.9	3.0	4.1	-1.5	-2.8
Taiwan	4.8	7.8	2.4	3.9	-2.4	-4.0
Hong Kong	5.8	7.4	4.2	5.3	-1.6	-2.0
Singapore	2.1	3.0	2.3	3.6	0.7	0.6
World*	779.0	949.9	789.3	924.0	4.1	-21.4

*Note: Intra-EC trade is excluded from trade balance data.

Source: Organisation for Economic Co-operation and Development. Monthly Statistics of Foreign Trade. June 1988.

will have to be made with respect to extra-EC trade relations. Some observers have commented that the removal of internal barriers to trade will, if not accompanied by some measures to restrict access to the EC market by outsiders, result in a free lunch for countries that do not provide reciprocal benefits to EC member states. This is because the overall effect of the removal of trade barriers would amount to a unilateral concession on the part of the EC to those non-EC countries that have been accused of restricting access to their markets. One analyst has noted:

> It seems likely that reciprocity principles could become a part of the new Common Market, and that access to Community markets could become a chit for bargaining with outsiders.

TABLE 4. European Community Trade, 1986-87
(expressed as a percentage of total trade)

	Imports		Exports	
	1986	1987	1986	1987
Inter-EEC Trade	57.1	58.0	57.1	59.1
EFTA	9.9	10.0	10.8	10.5
United States	7.3	7.0	9.3	8.7
Japan	5.9	4.4	1.4	1.6
Canada	0.8	0.8	1.1	1.1
OPEC	4.8	4.2	4.4	3.6
COMECON(Total)	3.2	3.0	2.6	2.4
COMECON(Europe)	3.2	2.9	2.5	2.4
Africa	5.1	4.4	4.6	4.1
South Africa	0.7	0.6	0.6	0.6
Latin America	2.6	2.4	1.8	1.7
Middle East	2.8	2.6	3.6	3.1
Far East	4.3	4.9	4.1	4.2
S. Korea	0.6	0.7	0.4	0.4
Taiwan	0.6	0.8	0.3	0.4
Hong Kong	0.7	0.8	0.5	0.6
Singapore	0.3	0.3	0.4	0.4
WORLD	100.0	100.0	100.0	100.0

Source: Calculated by CRS from data in Organisation for Economic Co-operation and Development. Monthly Statistics of Foreign Trade. June 1988.

> Commission officials are now saying that "if our partners want to take advantage of our integration and profit from the dynamism it will create, they will have to open their own markets on equivalent terms."[33]

The EC Commission has attempted to assuage the fears of Europe's major trading partners by suggesting that the main thrust of EC integration is to expand trade opportunities by enlarging the Common Market. Compelling evidence for this lies in the fact that the EC is quite possibly the world's largest trading bloc. Thus, it would appear that the EC has a vital interest in maintaining and expanding the world trade system, rather than disengaging from it.

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[33] Crawford, Morris H. EC'92: The Making of a Common Market in Telecommunications. Incidental Paper. Program on Information Resources Policy. Cambridge, Harvard University, July 1988. p. 24.

TABLE 5. European Community Trade with Selected Non-EC Countries
(as a percentage of EC trade with total non-EC countries)

	Imports		Exports	
	1986	1987	1986	1987
EFTA	23.1	23.9	25.2	25.8
United States	17.1	16.6	21.7	21.4
Japan	13.7	10.5	3.3	3.9
Canada	1.9	2.0	2.6	2.7
OPEC	11.3	10.1	10.2	8.9
COMECON(Total)	7.5	7.1	6.1	5.9
COMECON(Europe)	7.4	7.0	5.9	5.8
Africa	11.9	10.4	10.8	10.0
South Africa	1.7	1.4	1.4	1.5
Latin America	6.0	5.6	4.2	4.2
Middle East	6.5	6.2	8.4	7.6
Far East	9.9	11.5	9.6	10.3
S. Korea	1.3	1.7	0.9	1.1
Taiwan	1.4	2.0	0.7	1.0
Hong Kong	1.7	1.8	1.2	1.4
Singapore	0.6	0.7	0.8	0.9

Note: Intra-EC trade is excluded from calculations.

Source: Calculated by CRS from data in OECD. Monthly Statistics of Foreign Trade. June 1988.

The EC Commissioner responsible for external trade, Willy de Clercq, has denied that the EC is interested in establishing "fortress Europe." Although the EC is far from finalizing its post-1992 trade policy, a number of principles are beginning to emerge. According to the Financial Times, de Clercq identified the key concept as "overall reciprocity." In an article on a recent speech by de Clercq, the Financial Times noted:

> If Mr. de Clercq's approach is to be taken at face value, it is not one that will provide much comfort to Europe's trading partners, however reassuring and beguiling the language in which it is couched.
>
> There are three main strands to the emerging concept of EC trade policy after 1992 as he expounded it this week in London. First, he insisted repeatedly that the single market would not lead the EC into actions that conflicted with its international obligations under the General Agreement on Tariffs and Trade (GATT).
>
> Second, he was adamant that the economic advantages of opening up the European market should not be extended unilaterally to third country trading partners, from whom reciprocity would be demanded in return.

> And third, there would be a small hard core of areas such as motor vehicles, imports from certain East European and developing countries, and textiles where import restraint would have to continue.[34]

Although no one can accurately judge how reciprocity will be implemented, it is probably fair to say that those areas not presently covered by the GATT (services, investment, intellectual property rights) will be most affected by reciprocity. There is no indication at present that the EC will take actions that reverse the EC commitment to the GATT process. De Clercq has stated, "We shall be ready and willing to negotiate reciprocal concessions with third countries, preferably in a multilateral context but also bilaterally. We want to open our borders, but on the basis of a mutual balance of advantages in the GATT."[35]

Various countries will react to the 1992 program in different ways. The United States, which is generally considered one of the most open markets in the world, will probably have little to fear from full implementation of the 1992 plan (see discussion below). Japan, the Newly Industrializing Countries (NICs), and other developing countries, however, will undoubtedly be distressed by the EC's increasing emphasis on reciprocity. Although these countries will clearly stand to benefit from the creation of a much larger, more dynamic European market, they may be unable to do so unless they provide concessions to the EC that are at least equal in terms of the economic benefits that they expect to receive.

EC Commissioner de Clercq said: "In many cases, we will have to pursue a symmetry not so much in the legal equivalence of conditions of access, but rather an equivalence in their economic effects."[36] In defining reciprocity, the EC has probably done little to allay the fears of those countries with the greatest trade imbalances. The EC, however, is undoubtedly mindful that it has an interest in expanding its own opportunities in the international marketplace. Countries that have not effectively opened their markets to EC exporters may find more incentive to do so as 1992 approaches.

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[34] Montagnon, Peter. Looming Shadow of Fortress Europe. Financial Times, July 14, 1988. p. 16.

[35] Montagnon, Peter. Looming Shadow of Fortress Europe. Financial Times, July 14, 1988. p. 16.

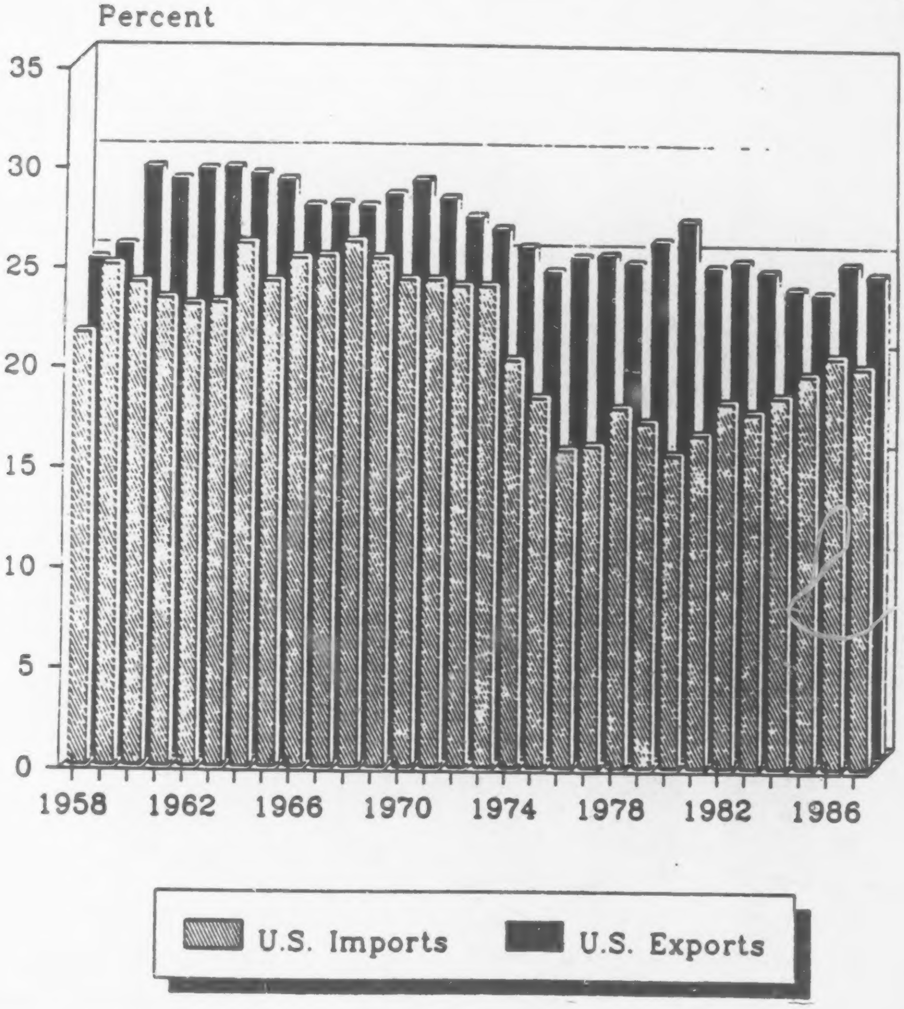
[36] Ibid.

TABLE 6. U.S. Trade with the EC: Total and for Selected Commodities, 1986-87
(millions of dollars)

	1986	1987	1986-87 Change Value	 Percent
U.S. IMPORTS, TOTAL (general, c.i.f.)	79,520	84,876	5,356	6.7
Beverages, alcoholic	2,611	2,648	37	1.4
Crude petroleum	1,985	2,166	181	9.1
Refined petroleum products	1,939	2,079	140	7.2
Manufactures, total	69,144	74,023	4,879	7.1
Autos	9,690	11,121	1,431	14.8
Organic chemicals & products	2,565	3,076	511	19.9
Aircraft, spacecraft & parts	2,426	2,590	164	6.8
Parts of motor vehicles	2,092	2,388	296	14.1
Specialized industrial machinery	1,586	1,694	108	6.8
Parts of internal combustion engines	1,533	1,613	80	5.2
Footwear	1,613	1,501	-112	-6.9
Precious & semiprecious stones and pearls	1,195	1,306	111	9.3
Iron & steel plates & sheets	1,382	1,227	-155	-11.2
Jewelry	1,303	1,218	-85	-6.5
Measuring & checking instruments	1,084	1,216	132	12.2
Furniture & parts	1,155	1,174	19	1.6
Parts for office & ADP machines	855	1,169	314	36.7
U.S. EXPORTS, TOTAL (domestic & foreign, f.a.s.)	53,154	60,575	7,421	14.0
Soybeans & other oilseeds	2,106	2,152	46	2.2
Animal feedstuffs	1,545	1,517	-28	-1.8
Coal	1,615	1,279	-336	-20.8
Manufactures, total	40,774	47,884	7,110	17.4
Aircraft, spacecraft & parts	4,137	4,979	842	20.4
Parts for office & ADP machines	3,705	4,425	720	19.4
ADP machines	3,497	4,198	701	20.0
Internal combustion engines	2,002	2,230	228	11.4
Measuring & checking instruments	1,937	2,108	171	8.8
Organic chemicals & products	1,407	1,726	319	22.7
Synthetic resins & plastics	1,131	1,290	159	14.1
Medicines	1,289	1,278	-11	-0.9
Electronic components & parts	1,043	1,216	173	16.6

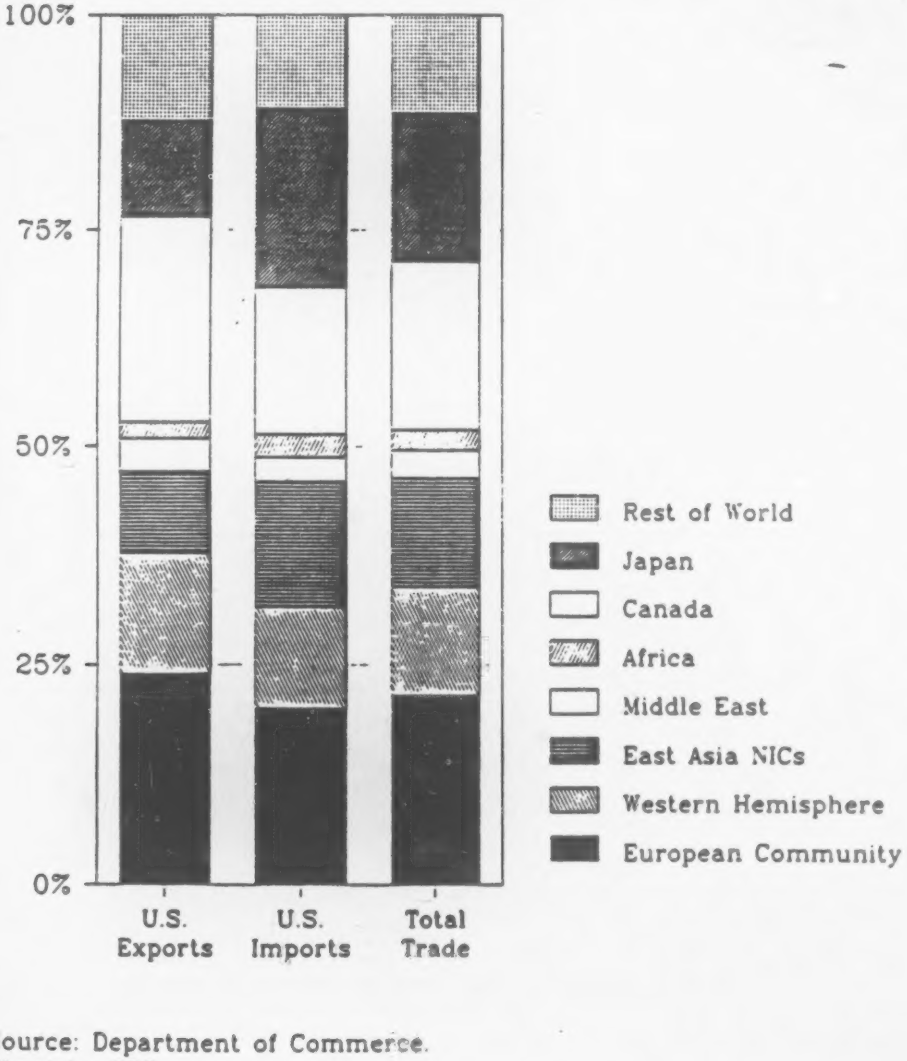
Source: U.S. Department of Commerce. United States Trade Performance in 1987. June 1988. p. 43. Data in tables 3 and 6 are from different statistical sources and do not agree.

U.S. Trade with the EC, 1958–87
(as a percent of world trade)



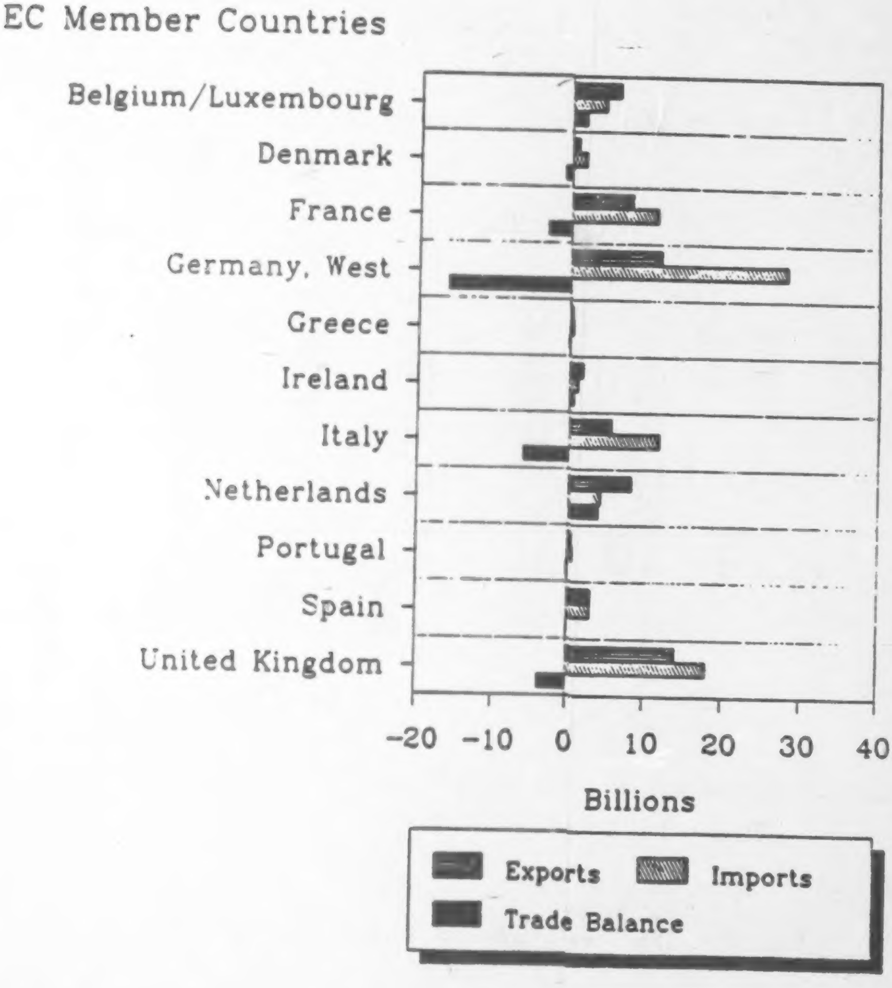
Source: Dept. of State.
Chart by CRS.

U.S. Trade: Major Partners, 1987
(Percent of Imports, Exports, and Total)



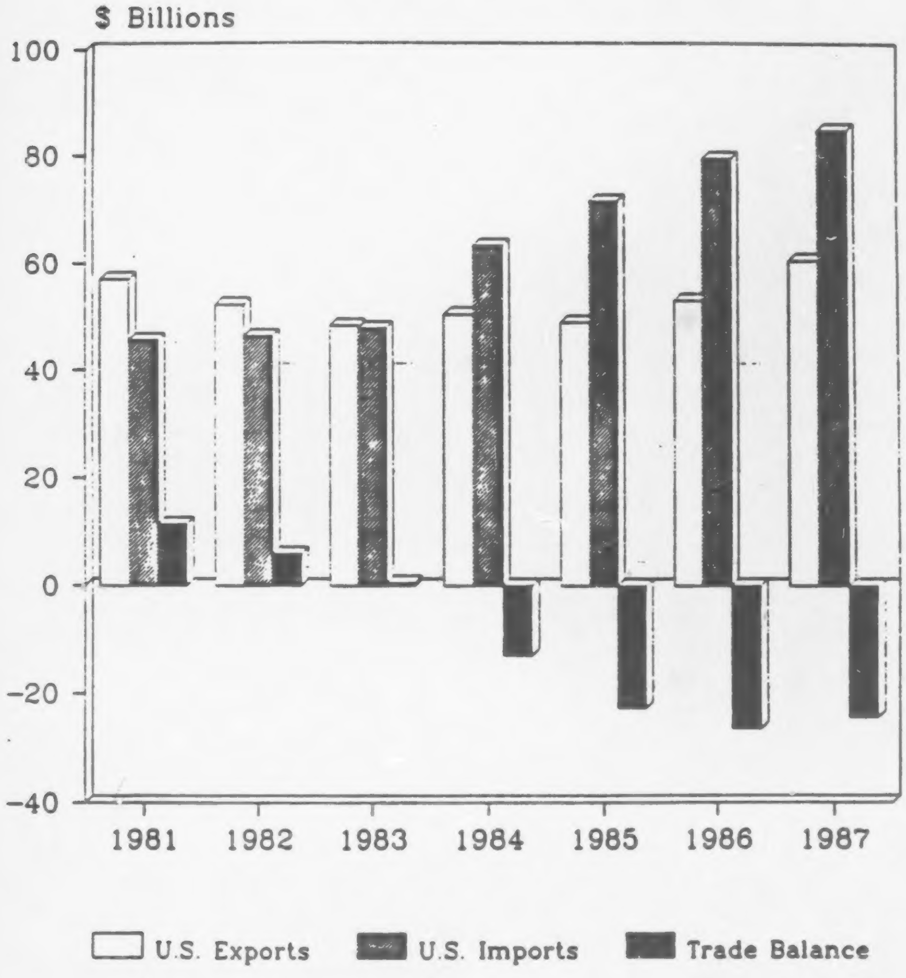
Source: Department of Commerce.
Chart by CRS.

U.S. Trade with EC Members, 1987
Imports, Exports, and Balances



Source: U.S. Dept. of Commerce.
Chart by CRS.

U.S.-EC Trade, 1981-1987
Exports, Imports, Trade Balance



Source: Department of Commerce.
Chart by CRS.

U.S. REACTION TO THE 1992 PROGRAM

The United States has generally favored increased European integration. At times, U.S. interest has been higher than at others, but nevertheless, no opposition to the idea of integration has been voiced. Recent progress toward the goal of an integrated European market has been considered generally to be a favorable development. The potential benefits for the United States are numerous, with expanded trade and investment opportunities considered to be the principal economic benefits. Increasingly, however, concern has been voiced that the European Community may take measures to exclude the United States from the integrated market. Whether such concerns are justified is open to debate. Nevertheless, the Reagan Administration has identified several potential areas of concern, including protectionism, reciprocity, and transparency.[37]

Protectionism

Some EC member countries use import quotas to protect certain domestic industries, especially automobiles and textiles. The EC Commission has indicated that transitional measures may be adopted to provide "temporary" protection to affected sectors. Although such protection might be temporary, it would effectively expand trade restrictions from localized segments of national markets to the entire European Community. The Administration position is that GATT-illegal national requirements should not be expanded because of their possible effects on U.S. exports. The risk to the United States would primarily be trade diversion by countries that may find themselves excluded from the EC market.[38]

Increased protection in other areas are also a worry to some Administration officials. M. Peter McPherson, of the U.S. Treasury Department, for instance, has argued that new and greater discrimination may result from a protectionist impulse that may accompany the development of EC-wide commercial and industrial policies. As an example, he cited the following areas where new policies are being developed: the right of establishment, mergers and acquisitions, government procurement, subsidies, local content requirements, and standards and certification. McPherson stated that discrimination in these areas would violate existing obligations under the OECD, the GATT, and the Tokyo Round Codes.[39]

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[37] U.S. Department of State. The European Community's Program to Complete a Single Market by 1992. July 5, 1988. p. 4-5.

[38] U.S. Dept. of State. The European Community's Program to Complete a Single Market by 1992. July 5, 1988. p. 4; McPherson. The European Community's Internal Market Program: An American Perspective. August 4, 1988. p. 4.

[39] McPherson, The European Community's Internal Market Program, p. 4.

Reciprocity

Reciprocity is another area of concern to the United States, because of its potential to undermine multilateral trade liberalization in the Uruguay Round of the GATT.[40] Although the EC Commission favors multi-

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[40] "Reciprocity," like "fair trade," is a concept that can mean many things to many people. Although a considerable degree of ambiguity attaches to such concepts, few doubt their underlying soundness as principles for conducting trade policy. What might be understood as reciprocity by one person, however, may well be understood in an opposite sense by another. Reciprocity has been a central concept of U.S. trade policy since the adoption of unconditional most-favored-nation (MFN) treatment in 1923.

The MFN principle of nondiscrimination is the cornerstone of the GATT (i.e., Part I, Article I of the General Agreement on Tariffs and Trade provides that a country's tariffs should be applied equally to all members of the GATT). Article III of the GATT provides for national treatment (or that imported goods should be treated no less favorably than similar domestic goods) by member countries and prohibits the employment of non-tariff policies that discriminate against imports in favor of local products. The principles enshrined in Articles I and III are examples of "unconditional" reciprocity, or "policy" reciprocity.

The concept of reciprocity now appears to be changing both in the United States and elsewhere. The Omnibus Trade Act of 1988 appears, in part, to embrace "conditional," or "quantitative," reciprocity. The European Community, as will be discussed in this section of the report, is also moving toward more conditional forms of reciprocity. "Quantitative" reciprocity typically is bilateral; tends to limit most-favored-nation and national treatment; and seeks a balance in the results of trade. Instead of a balance of obligations, conditional reciprocity seeks an equivalency of results. In 1922, William S. Culbertson, of the U.S. Tariff Commission, wrote:

> Our traditional most-favored-nation policy [until 1922] dates from 1778. It is based upon the idea that treaty bargaining concerns primarily only the contracting states and that a reduction, made upon the "condition" that certain reductions be made by the other party, is not to be granted to any third power unless that power gives an "equivalent" concession. (Culbertson. Reciprocity: A National Policy for Foreign Trade. New York, Whittlesey House, 1937.)

Reciprocity is not a static concept. The adoption of unconditional reciprocity in 1923 may have reflected the attitudes of a period in which the United States was growing rapidly as an international industrial and financial power. The reaffirmation of unconditional reciprocity in the aftermath of World War II may have reflected the United States preeminent position as the world's unrivalled economic power. The gradual return to older forms of limited or conditional reciprocity may -- although it would be difficult to prove--

(continued...)

lateral trade liberalization, it will probably pursue bilateral liberalization as a parallel process. Where agreement cannot be reached multilaterally or bilaterally, the EC will probably act to deny market access to those countries that deny access to European firms.

It is important to note that the United States has also increasingly moved in the direction of establishing reciprocity as a guiding principle for determining who will gain (or lose) access to the U.S. market. The Omnibus Trade Act of 1988 (P.L. 100-418), for example, includes telecommunications trade provisions, among others, that provide for a number of specific Presidential actions against countries that do not provide "mutually advantageous market opportunities for trade in telecommunications products and services."[41] One reason cited in the 1988 Telecommunications Trade Act for this reciprocity requirement was the fact that the unilateral reduction in barriers (i.e., the breakup of AT&T) by the United States was not accompanied by any similar liberalization in telecommunications trade by other countries.

The EC is well aware of the reciprocity provisions contained in P.L. 100-418.[42] One of the major complaints by the EC against the new trade law is that a unilaterally imposed reciprocity appears to be a cornerstone of several sections of the law. Reciprocity is widely viewed as a tool for gaining access to markets that are protected from foreign competition. Although reciprocity would seem to provide a reasonable basis for formulating trade policy, the primary complaint raised by critics is that its main impulse is protectionist, and it lends itself

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[40](...continued)
demonstrate some of the difficulties of multilateral trade policy in a world in which competition among countries is more equal. "Policy" reciprocity has seemingly given way to "quantity" reciprocity as nations and trading blocs have increasingly sought to balance trade in terms of quantity and economic effect.

Throughout this report, the term reciprocity should be understood in its more limited or conditional sense, unless otherwise specified.

[41] Telecommunications Trade Act of 1988. Part 4 of Subtitle C of Tile I of the Omnibus Trade and Competitiveness Act of 1988.

[42] The EC Commission expressed it view of U.S.-EC relations in the following terms:

> It would be unfortunate if the opportunities for trade expansion and mutual benefit which this situation undoubtedly presents were put at risk by narrowly conceived trade legislation in the U.S. and the implementation of unilateral and unjustified measures against trading partners. The Community should continue to adopt a positive profile in developing its dialogue with the United States.

EC Commission. Towards a Dynamic European Economy. Green Paper on the Development of the Common Market for Telecommunications Services and Equipment. COM(87) 290 final. Brussels. June 30, 1987. p. 165-166.

to unilateral and arbitrary demands for concessions from foreign countries.

The imposition of unilateral reciprocity requirements has the potential to undermine the national treatment provisions of Article III of the GATT. Although services are not covered by GATT, the Uruguay Round of the GATT negotiations is expected to consider extending coverage to services. If the United States and the EC adopt a narrow form of reciprocity as the basis for granting multilateral or bilateral access to markets, the Uruguay Round may not produce the results (i.e., trade liberalization and the extension of GATT to services) that both parties appear to desire. Additionally, strict adherence by one party to a narrow definition of reciprocity might lead to retaliation by trade partners that are unable or unwilling to grant the concessions that are being demanded.

Of particular interest to the United States are Community-wide rules affecting banking. The EC Commission has indicated that it will grant third-country banks an EC-wide right of establishment and the ability to offer universal services if EC banks are given reciprocal treatment. This requirement may limit access by U.S. banks to the EC market because of U.S. banking regulations that restrict banks both geographically and in terms of the services that they may offer.

The Reagan Administration has argued that national treatment, rather than strict reciprocity, should be the standard for access. The banking and financial services rule proposed by the EC Commission illustrates the problem with strict reciprocity: in order for U.S. financial institutions to retain access to the EC marketplace after 1992, the United States would have to change its banking regulations to permit banks to do things that are currently not allowed by law. As Deputy Secretary of the Treasury McPherson has noted:

> The notion of reciprocity enjoys considerable simplistic appeal, because it suggests fair and equitable treatment. The Commission's proposal, however, would require countries to mirror the laws and regulations of the EC in order to have equal access to the internal market. The danger of this approach is that legitimate differences in national regulatory regimes could be used to justify discrimination against foreign firms.[43]

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[43] McPherson, The European Community's Internal Market Program, p. 5. Some analysts have suggested that there is a basic difference between the European Community's concept of "mirror" reciprocity and the "mutually advantageous market opportunities" concept contained in the Omnibus Trade and Competitiveness Act of 1988. The difference, it is argued, is that the new U.S. law continues to be based on "policy" reciprocity and national treatment, while the EC concept appears to demand identical, rather than national, treatment. Other analysts have taken the view that, because the new trade law gives the President the authority to take retaliatory action against those countries that do not provide "mutually advantageous market opportunities," the U.S. approach appears to be very similar to the EC position.

Reciprocity may be one of the major policy issues during the years leading up to 1992. Growing protectionism in either the United States or the EC could elicit a protectionist response by the other. On the other hand, national treatment might emerge as the guiding principle for U.S.-EC trade relations if occasional tensions are diffused through a regular and open dialogue between the United States and the EC.

Transparency

The 1992 program is being implemented through 285 directives. Prior to their adoption, each directive is published and circulated for comment. The State Department has noted, "the U.S. is encouraged by Commission declarations that the EC will proceed in an open and transparent fashion as it constructs the single market..."[44] The Administration is concerned that third countries be allowed to review and comment on Commission proposals in a "meaningful way."[45]

Public Procurement

The development of a common public procurement policy is one of the most important issues with which the European Community will have to deal. More than any other issue, it will define whether Europe is seeking to expand its market and liberalize world trade, or whether the 1992 Plan will provide nothing more than a limited multilateral free trade agreement among the members of the Community. Restrictive public procurement practices represent a fourth major type of barrier to intra-EC trade (the first three types of internal barriers were discussed in an earlier section of this report). Such practices also tend to reduce international trade opportunities, as well as the competitiveness of the countries that employ systematic discrimination against non-domestic firms in public procurement.[46]

Competition in public procurement is practically nonexistent at the Community level. Discriminatory practices are used by national governments as a matter of public policy to exclude non-national firms from competing against domestic companies. The EC Commission has proposed opening all public purchasing (including public procurement, i.e., the portion of public purchasing covered by formal contracts) to intra-Community competition.[47]

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[44] Department of State, The European Community's Program to Construct a Single Market by 1992, p. 5.

[45] Ibid.

[46] Cecchini, Paolo. The European Challenge, 1992: The Benefits of a Single Market. Aldershot, Gower Press. 1988.

[47] A discussion by the EC Commission on public procurement barriers may be found in: EC Commission. The Economics of 1992. European Economy, no. 35, March 1988. p. 54-59.

The value of government procurement in EC member states has been estimated at approximately $490 billion per year,[48] but only 20 percent of such contracts are subject to open tendering.[49] The EC Commission has calculated that only 2 percent of public supply contracts and only 2 percent of public construction contracts have been awarded to firms from other EC member states. The long-range goal of the Commission is to open about 80 percent of public purchasing to EC-wide competition. Foreign, or extra-EC, participation in public procurement may be limited to those countries that provide reciprocal access to the EC. Because of the importance of public procurement and the possibilities for U.S. businesses should the procurement process become open, the issues of access and national treatment are of importance to the United States Government and U.S. business alike.

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[48] This estimate has been cited by the Department of State. The European Community's Program to Complete a Single Market by 1992. p. 6. The EC Commission has estimated that total public purchasing amounted to 535 billion ECU (or $669 billion at a rate of exchange of $1 = ECU 1.25). The importance of public purchasing (including procurement) is clear. In 1986, it amounted to approximately 15 percent of GDP. EC Commission. The Economics of 1992. p. 54.

[49] Department of State. The European Community's Program to Complete a Single Market by 1992. p. 6.

APPENDIX

CHART A-1. Single Market Regulations for Standards, Testing, and Certification

EC-wide Standards for:

Simple pressure vessels
Toys
Automobiles/Trucks/Motorcycles
Vehicle emissions
Telecommunications
Construction products
Personal protection equipment
Machine safety
Measuring instruments
Medical devices
Gas appliances
Tractors (agric. and forestry)
Cosmetics
Quick frozen foods
Flavorings
Food Emulsifiers
Extraction solvents
Food preservatives
Medicinal products & medical specialities
Earthmoving equipment
Infant formula
Jams
Modified starches
Fruit juices
Food inspection
Definition of spirited beverages & aromatized wines
Coffee & chicory extracts
Food additives
Material & articles in contact with food
Tower cranes (noise)
Household appliances (noise)
Tire pressure gauges
Hydraulic diggers (noise)
Detergents
Liquid fertilizers & secondary fertilizers
Lawn mowers (noise)
Radio interferences
Lifting and loading equipment

Source: Department of Commerce.

APPENDIX

CHART A-2. Single Market Regulations for Packaging, Labelling and Processing

EC-wide Standards for:

- Ingredients for food and beverages
- Irradiation
- Extraction solvents
- Nutritional labelling
- Food labelling
- Classification, packaging, labelling of dangerous preparations

Source: Department of Commerce.

APPENDIX

CHART A-3. Single Market Regulations for Services

EC-wide Standards for:

Banking
Mutual funds
Broadcasting
Tourism
Road passenger transport
Railways
Information services
Life & nonlife insurance
Securities
Maritime transport
Air transport
Electronic payment cards

Source: Department of Commerce.

CHART A-4. Single Market Regulations for the Free Movement of Labor and the Professions in the EC

EC-wide Standards for:

- Mutual recognition of higher education diplomas
- Comparability of vocational training qualifications
- Specific training in general medical practice
- Elimination of burdensome requirements related to residence permits
- Training of engineers
- Activities in the field of pharmacy
- Activities related to commercial agents
- Income taxation provisions

Source: Department of Commerce.

International Affairs

EC President Jacques Delors on European Unity

PM0702142289 London THE INDEPENDENT in English 7 Feb 89 p 17—FOR OFFICIAL USE ONLY

[Report on undated interview with European Commission President Jacques Delors by Peter Jenkins: "Step by Step Towards Unity"]

[Text] It was plain from the first moment that President Jacques Delors had been stung by Nigel Lawson's public attack upon him in a recent speech at Chatham House and was alarmed at the state which had been reached in relations between the European Commission and the British Government. He at once set about refuting Mr Lawson's charge that he was jeopardising the completion of the single market by 1992 by raising other, contentious, issues such as economic and monetary union.

The tone of our conversation in his office in the European Community headquarters in Brussels was conciliatory, at moments almost contrite—intended, perhaps, to serve as an olive branch to London. He gave the impression of fully having taken on board the lesson that Mrs Thatcher, and the British people, were easily frightened by grandiose declarations or institutional schemes for uniting Europe and that it was better to proceed pragmatically and step by step. He hinted that this would be the approach of the Delors Committee, which is to report to the European Council in Madrid next summer on economic and monetary co-operation.

Mr Delors was at pains to stress throughout that as president of the European Commission he was the servant of his political masters. Nevertheless, the mandate of the Single European Act was very clear, he said, and Mrs Thatcher had signed it for Britain. Nothing, he insisted, could be allowed to divert the Commission from achieving the objectives set out in the Act. That was its duty and, as president, he was not prepared to see postponed any decision relating to the Act, at the heart of which was the completion of the single market.

"It is very important to say this," he said, "because perhaps the temptation to speak about political integration or monetary union gives the impression that the Commission is not concentrating on its proper duty. But this is false."

The appointment of the Delors Committee to study this matter had not been at his initiative. A year ago many of the political leaders were saying that it was impossible to conceive the future of the European economies without economic and monetary union. That had led last June to the European Council in Hanover giving a mandate to the ad hoc committee of which he had been made chairman.

He insisted a clear distinction be made between his mandate as president of the European Commission and this other, limited and temporary mandate. They were very different roles.

Of course, there had to be a political debate about the future of Europe but "I cannot accept the accusation that I am a divisive force. No. As a citizen, I have my view of the future of Europe beyond 1992 but I must insist on the distinction between my duty as president of the Commission and my views as a citizen." As president of the Commission, everything he did was on the basis of a political mandate from the governments. "During the four years of my first term as president I have devoted all of my energies to reaching a consensus among the 12 members of the Community," he insisted.

But it was as President Delors, not Citizen Delors, that he had addressed the European Parliament in Strasbourg and provoked Mr Lawson's counterblast by saying that progress towards economic and momentary union "would be considerably facilitated by an appropriate institutional framework" which would require further amendments to the Treaty.

Here he made another distinction—between what was required by the completion of the internal market by 1992 and what would be required for the achievement of a fully- fledged economic and monetary union. Since 1986 he had been warning governments that the removal of exchange controls would bring flows of "hot" money across the exchanges and make for a very difficult situation for Europe. For there to be an efficient single market, a minimum of co-operation was required in the macro-economic and monetary fields. But when he made this point he was speaking about closer cooperation within the existing European Monetary System (EMS). It has nothing whatever to do with hopes of building in 10 or 20 years a United States of Europe: It was addressed to what was happening between independent states in Europe today.

He gave an example. During the past two years it had been very difficult to combine closer cooperation within the EMS with the policy of the Bank of England. The members of the exchange-rate mechanism had agreed to sell deutschemarks and buy dollars to avoid a depreciation of the six major European currencies but, at the same time, the Bank of England—for different reasons—was buying Deutschemarks. Britain's co-operation was necessary for the function of an "efficient single market"—for the achievement of 1992. "Therefore," he said, "I hope that the British Government will reconsider its position and allow the pound to join the exchange rate mechanism of the EMS."

Economic and monetary union (EMU) was an entirely different matter. This was something governments would have to make up their minds about. It was on the agenda for the European Council in Madrid next June. Leaving aside the political approach of the British Prime

Minister, the discussion would be about the best way to proceed towards the goal of EMU. Would it be best to advance step by step, first achieving closer economic cooperation over a long period of time? Or was their need for a radical change in the institutional framework of the Community?

What he had said on this at Strasbourg, he said, had been intended to focus attention on the Delors Committee and avoid a great discussion about institutions and sovereignty. "I do not belong to this school of thinking," he said. The hint was that the Delors committee would come down for modest gradualism, not another grand and futuristic scheme for the constuction of Europe. There would be a debate, of course. Influential voices—Giscard d'Estaing, Helmut Schmidt, Hans Dietrich Genscher among them—favoured a new treaty quickly to serve as, what he called, a "dynamic framework" for economic and monetary integration. But others had mentioned lesser possiblities: reinforcement of the role of governors of central banks in the monetary field, a greater degree of economic convergence on the macroeconomic side. The impression given was that he was of the latter school. But he added: "This will not be for me to decide."

Mr Lawson had made another accusation. This was that there were some—and, clearly, the cap was intended to fit—who did not like the liberal, free-market vision of 1992 and were "trying to claw back lost ground, substituting a concept of 1992 based on supranational regulation..."Mrs Thatcher had made a similar point in the famous Bruges speech when she said that the frontiers of the state had not been rolled back in Britain in order for them to be rolled forward again in Europe.

Mr Delors bridled at this. The charges had plainly stung and annoyed him. It was not fair and it was not true. "In such an atmosphere it is not possible to conduct a fruitful dialogue. I am not the advocate of any one political tendency. I respect the prevailing tendency in British politics (Thatcherism) and I understand the internal difficulties of your country. Therefore, when I speak about the 'social dimension' of Europe, I speak in pluralistic terms. I am not seeking to impose on Great Britain something that its own citizens have rejected. But there are also three other political tendencies in Europe: Christian Democrat, Social Democrat and classical Liberal. And we must live together."

"I don't know of any historical example of a Liberal market without a minimum of regulation and, frankly, it is possible to discuss quietly this question. The question is when can a regulation at the European level work more efficiently than at the national level. Believe me, I repeat each week to my top civil servants: 'Please, avoid all directives, all initiatives, which are not indispensable to an efficient single market'."

As for the "social dimension" it was there in the Single Act, which the British had signed, but what was being proposed would take account of this "pluralism" he had spoken of. For example, on worker participation all that was being proposed was that there should be the "possibility" for collective agreements between managements and workers. Enterprises should be "obliged to discuss with their workers." With their workers or trade unions, I asked? "That would be a problem for the British." He added that he was well aware of the problems there had been in British industrial relations and the role they had played in Britain's economic decline.

We turned to another contentious question: frontiers. The decision to dismantle them, he pointed out, had been taken by governments in 1984. The Commission was obliged to consider how to carry it out. It had been repeated in the Single European Act. On this he took exactly the same position as when the French Prime Minister expressed his concern in public about the reduction of indirect taxes. "I point out: 'This is the commitment of your country'."

Might other nations go ahead and remove their frontiers without Britain, I wondered? If countries wished not to change their minds about dismantling frontiers, he said, then they had better say so publicly to their citizens. But they should bear in mind that the dismantling of frontiers and a common currency are the Community's two most popular policies in Europe.

But this gave him the opportunity to say how all of his efforts were devoted to carrying Britain along with the others. On two or three occasions, when other countries had been tempted to reach decisions without Britain, he had opposed them. But the British must know that this was a potential danger. And they must think how to belong fully to the European Community without holding back the other countries.

How great was the danger of Britain being left behind?

"My feeling is that many chiefs of government will not accept standstill in the Community. That is because for many governments, the final purpose is political union. Political union is not for tomorrow. But without this political purpose it would not be possible to overcome the internal contradictions of Europe and achieve the single market. That is the reality. If governments were to say tomorrow: 'Our only goal is to achieve the single market', then it would not be possible to achieve the single market."

The dyanmic carrying Europe forward was, he believed, its response to the prospect of "Euro-sclerosis." The necessity of a single market had captured the imagination of the managers and—Mr Thatcher had not understood this—the trade unionists. That was why he had come to the TUC [Trade Unionists Congress] last summer. And as the mood had become more confident over the last four years, so the political ideal of United Europe had revived.

His own belief was that without ever-increasing cooperation between the members of the Community, not only was their material prosperity in danger but also their independence and influence in the world. However, Britain had to be a part of this enterprise. Britain, with all of its history, with its special relationship with North America and its Commonwealth associations, brought a great heritage to Europe. That was why, said President Delors, his efforts would always be towards reconciling the points of view of all member countries. His colleagues, would testify to this "obsession with consensus."

Thatcher To Act To Block EEC Frauds

PM0702142689 London THE TIMES in English 7 Feb 89 p 1—FOR OFFICIAL USE ONLY

[Robin Oakley report: "Thatcher To Attack Six Billion Pound EEC Fraud. Fears That Funds May Go to IRA And Mafia"]

[Text] The Prime Minister is spearheading a drive against fraud in the EEC which ministers have been told may amount to 6 billion pounds a year.

Mrs Margaret Thatcher has taken the initiative because of British concern at the extent of the frauds and fears that proceeds from agricultural subsidy fiddles are being syphoned off to the Mafia in Italy and to the IRA.

She raised the subject at last week's Cabinet meeting after Whitehall advice on the possible extent of the frauds, following the circulation among ministers of a report by the Court of Auditors, the EEC's financial watchdog.

The report revealed a series of export swindles and confirmed that control procedures were so weak that many export refunds were being paid on goods which never left the country of origin. The Prime Minister takes the view that with Britain contributing 2 billion pounds to the EEC budget, taxpayers here are funding a third of the fraud. What alarms ministers in particular is their belief that organized crime is benefiting.

Periods of sharp difference between the value of sterling and the Irish punt, for example, have enabled farmers to send cattle on walkabouts across the Irish border, collecting money as they went.

The revelations are likely to give EEC critics in Parliament a field day.

Mr John MacGregor, Minister for Agriculture, has taken the lead for some months in urging the European Commission to press laggard nations into action. He is to raise the subject again at the European Council meeting of agriculture ministers in Brussels next Monday and is expecting support from a number of his European counterparts.

Two fifths of the EEC's 31 billion pound budget nearly 12 billion pounds, is spent on export subsidies or refunds to European producers to bridge the gap between the high prices they can obtain for beef and other products within the EEC market, and the lower prices obtainable when they sell outside. But the Court of Auditors has found that checking procedures are hopelessly inadequate, that exports are made through non-approved ports and that proofs of arrival at the final destination have been of "dubious authenticity".

A year-long study of beef exports from Britain, Ireland, West Gerany and France found that as little as 1 per cent of loads were checked, when a single consignment could attract export refunds of 10,000 pounds.

There are established rackets in port-of-arrival documents and traders have been found with stacks of forged import papers.

The court found a series of weaknesses in the controls supposed to ensure that goods claimed for have actually left the country of origin.

One trader was found importing prime beef described as offal from South America to avoid import levies, and exporting offal declared as prime beef to claim subsidies in a swindle believed to have netted 10.4 million pounds. Another gained 1 million pounds by exporting chicken scraps as beef.

The British Government is not critical of the European Commission on the fraud question. Ministers believe the key lies in having efficient Customs and Excise operations. Mr Jacques Delors, the Commission President, recently accused some EEC goverments, which he did not name, of covering up fraud scandals.

Mr MacGregor will press the Commission next Monday to state what further steps it proposes to counter such widespread fraud.

He has pressed for greater use of the "disallowance" procedure, whereby the EEC auditors can refuse payment of Community funds to an enterprise after fraudulent claims have been found.

Mr MacGregor said last night: "We now need positive action. This must include looking at all new proposals and asking 'Is this susceptible to fraud or mismanagement?'"

* EC Internal Market, Schengen Treaty Examined

36140019 The Hague INTERNATIONALE SPECTATOR in Dutch Dec 88 pp 784-790

[Article by B.H. ter Kuile, professor of European Law, specializing in European Institutional Law, at the Erasmus University in Rotterdam: "Thatcher's Internal Market and the Schengen Agreement"]

[Text] How historians in time will judge the "great leap forward," which the European Community will make during the first half of the nineties, is uncertain. The political forces involved here are so complicated that a clear overview of the developments surrounding the formation of the so-called internal market within the Community is lacking. What is involved here, not exclusively but in the first place, is the development of an internal market, which has been defined in the EEC Treaty since the European Act[1] and should be distinguished from the concept of "common market," which was mentioned in the EEC Treaty as early as 1958.

For the last 10 years it has seemed that any real progress within the Community was blocked. And then, in February 1988 a political breakthrough occurred, which has made it possible on the basis of the European Act to work intensively on the internal market, a community space without internal borders among member states.[2]

The European Act, which became effective on 1 July 1987, has somewhat renewed the 30-year-old treaties on European economic unification: a supplementary new decision making procedure,[3] specifically concerning the formation of the internal market, which gives greater voice to the European Parliament, a number of new areas the Community can venture on,[4] the sanction of European Political Cooperation,[5] and official recognition of the European Council of heads of state and government leaders.[6]

In time, the internal market will be the result of a catching-up maneuver. The Community had already gotten far behind by 1970, when the establishment of a "common market," originally scheduled for 1 January 1970, was far from having been accomplished.[7] The internal market, defined in Article 8A of the EEC Treaty, is less far-reaching than the common market which is extensively talked about, but not precisely defined, in the Treaty. These two markets are not identical. They are to be distinguished, but not always to be separated. The internal market is an intermediary phase, on the road to achieving a common market.

The "Europe of 1992" has grabbed attention of the citizens, enterprises, and national governments of the various member states. There is an enthusiasm for European unification—which has been unknown since the sixties—although not always great insight in the consequences which the formation of such an internal market will produce. Those consequences are not always foreseen. Not even by the government leaders of the member states. And that is all to the good, because real progress cannot be expected if all the parties involved were able to foresee all the consequences of their actions—including from an electoral point of view—beforehand.

One of the aspects which was not given enough attention in the buzz of the prehistory and the development of the European Act, is the social dimension of the internal market. Apparently, the employer organizations were little prepared for the events around 1984-1986. They allowed themselves to be taken by surprise and little attention was paid to their views in the paragraph concerning the social aspects of the market without internal borders. Presumably, that social dimension is of uncommonly great importance to all the social partners and governments of the member states. Thinking about it has started only recently.

First of all, with an internal market without borders the national social security systems and the current national wage levels with secondary labor provisions will continue to exist in each of the member states. Due to the resulting differences in overall labor costs within a single market, entrepreneurs will consider concentrating their production in relatively less expensive areas. Workers, on the other hand, will consider going to work in areas where the labor conditions are better for them. Without further regulation of the Community, there could initially be a major imbalance on the labor market. The demand for manpower would then increase in cheaper areas because of the concentration of production units; but it is specifically in the expensive areas that the supply of manpower rises. There could be a trend whereby producers would move from North to South and workers from South to North. By the time the labor market would once again be somewhat balanced, the economic structure of the Community could have been drastically altered. The expected migration of workers within the internal market could possibly remain limited if it became clear that the specific manpower demands are related nearly exclusively to highly skilled workers.

The European Commission, the community body in charge of making proposals to take the necessary Community measures, did not deal separately with this social paragraph in its 1985 White Paper, which includes the program of measures for the formation of the internal market.[8] That initiative was triumphantly announced in April 1988,[9] but in fact it involves a forgotten area. The labor organizations, whose strategy is often rather nationalistically oriented, allowed this to happen. Thus, interest in the consequences of the internal market for medium and small size enterprises developed only in 1988.[10]

There is uncertainty as to the extent to which, on a much larger scale than has been the case over the last 30 years, one of the consequences of the internal market might be that important responsibilities of the national legislators and governments of each of the member states will be transferred to the Community in the short term.

Through the creation of the internal market, Community law will penetrate the legal system of the member states in areas which earlier appeared reserved to the national authorities. One could think of energy policy, of important parts of the health care system, of environmental policy,[11] of media policy, and of the area of social security. The fact that the transportation sector (air, sea, and railroad transportation, road and internal waterways transportation) would become part of the European domain was already clear in the "old" Treaty.[12] It is precisely in the area of transporation policy that European unification has gotten seriously behind, which will have to be taken care of with the formation of the internal market.

This transfer of national sovereign rights by the member states to the Community is not a new phenomenon. The Treaty already provided for this in 1958; however, it will have to occur at an accelerated rate and more intensively over the coming years. This transfer of sovereign rights will touch vital policy areas in each of the member states. It remains to be seen whether this development has been adequately thought out. Recent reactions in a few member states, such as Great Britain and France, have made it clear that government leaders have been shocked by the possible consequences which the formation of the internal market will have on control within their own countries. The speech made by the British prime minister in Bruges on 20 September 1988 was an example of this.[13] Last summer, the French prime minister also exhibited the first signs that France might also back out.

This means that, in addition to the inevitable technical field of tension generated by the creation of such a large operation as the internal market, a major political field of tension has once again developed, which for a moment in early 1988 seemed to have been eliminated. Generally speaking, this political field of tension does not stimulate European integration.

Consequences of the Formation of the Internal Market

To evaluate the consequences of the internal market, one will first have to look at the formal definition of that market. Article 8A of the EEC Treaty says, among other things:

"The internal market consists of a space without internal borders in which the free transportation of goods, persons, services, and capital is guaranteed according to the provisions of this Treaty." That does not say much. It does indicate that the elimination of delays and other impediments at the national borders of the member states is not a distant, idealistic goal of Euro-optimists, but a real part of an operation which has already been started."

It has been left up to the Court of Justice of the European Communities (hereafter EC Court) to provide an explanation of the meaning of Article 8A of the EEC Treaty.[14] It is possible that the EC Court will already be called on at an early stage in the formation process of the internal market to act as highest court and provide a binding interpretation of the content and orientation of Article 8A of the EEC Treaty. At least two questions could be at the center of this:

—do the words "space without internal borders" mean that the barriers at the borders between member states must be completely eliminated at the time of the creation of the internal market; and

—is the deadline for this, mentioned in Article 8A of the EEC Treaty (31 December 1992), a firm date or only a political target date.

In this respect, the European Commission is rather direct in its 1985 White Paper. When the barriers have been eliminated in technical and fiscal areas and solutions have been found to other important questions, such as the safety of the citizens, immigration, and drug control, then there wil no longer be any reason for the existence of borders, according to the Commission.[15]

Even though all import levies and quantitative import limits, as well as measures which act similarly to such levies or limits, have been eliminated in trade traffic among the member states,[16] except for those member states which joined recently, there are still impediments at the national borders to a free crossing of the borders. This applies to the traffic of both people and goods. Aside from identity checks, the barriers are needed primarily for complicated calculations of value added and excise taxes, which are imposed by community regulations[17] for the international transportation of goods.

The European Commission is aiming for the complete elimination of all these controls at the internal borders.[18] It has introduced proposals to this effect, which will already (have to) be in effect before the internal market itself become a fact.[19]

Thus according to its third Report[20] the Commission has made a proposal to allow duty free entry of fuel in truck gas tanks. In principle, this duty is still being collected at the border between member states. Another proposal is to eliminate double controls at internal border posts between member states. In addition, work will have to be done especially to eliminate fiscal borders. The European Council's sixth value added tax guideline will have to be amended so that sales and purchases across internal community borders will be handled the same way as those within the member states. This will require the establishment of a clearing institute, in order to ensure that the value added tax collected in the exporting member state and the value added tax subtracted in the importing member state will revert to the treasury of the latter member state. Furthermore, the Community will have to achieve an adjustment of value added tax rates, and this specifically within two areas (normal rates of 14 to 20 percent and special rates from 4 to 9 percent). A corresponding rate harmonization will also have to take place for various excise taxes.[21]

According to Article 99 of the EEC Treaty, such measures aimed at the harmonization of member state legislation concerning indirect and excise taxes must be adopted unanimously by the Council. As of now it is uncertain whether such unanimity within the Council can be achieved. In mid-1988, the British minister of finance let it be known that the adjustment, specifically of value added tax rates, is unnecessary. In his opinion, the free market mechanism which would prevail on the internal market as a result of active, unadulterated competition, would itself take care of such a rate adjustment. No special Community measures are necessary for this.

At about the same time, the French prime minister added his thoughts by stating that a real reduction of value added tax rates within the framework of harmonization measures would represent a sizeable loss in income for the French treasury. This would be contrary to the primary interests of the French state. Hence, such a tax harmonization is unacceptable to France.

If the current Commission proposals do not succeed on this point, then the need to levy value added and excise taxes at the borders between member states will continue to exist. In that case it would not be possible to remove the barriers before 1993, and a Community with an internal market, a space without internal borders, would be temporarily unachievable. If, in the years to come, the Council were to issue a directive which leaves the national barriers at the borders intact, the EC Court might be called on to decide whether such a directive is contrary to a higher regulation in the EEC Treaty, specifically Article 8A, which talks about a space *without* internal borders.

Such a procedure would in any case be time consuming. For now, dark clouds are gathering over the European Commission's tax and excise proposals. These proposals require unanimity within the Council, and for now that does not appear to be in the cards. That implies that in terms of the international traffic of goods, border controls between member states would remain necessary and that consequently no internal market, in the sense of a space without internal borders, would come about. The consequences of such a development are hard to gage. That is reason enough to frown.

In her speech on the occasion of the opening of the academic year at the College of Europe in Bruges on 20 September 1988, British Prime Minister Thatcher made the creation of an internal market uncertain in yet another way. That uncertainty does not stem from the fact that Prime Minister Thatcher expressed her opposition to the internal market as such. On the contrary. She has shown herself to be in favor of such an internal market within the Community.[22] The desirability of a more free community traffic of goods and persons is a matter of course to her. But common sense dictates that one should continue the controls at the national borders of the member states to counter the possible movement of terrorists and the drug traffic.[23]

With the British view of a development of European unification which would not lead to a European Union, but at most to a Gaullist Europe of States, maintaining border controls for intracommunity traffic is a matter of course. The barriers at the borders are raised somewhat more readily, but they cannot be removed during the first years. Not because of the traffic of economic goods and persons, but because of national security and the individual security of the citizens. In this view, that theme is not directly relevant to the Community Treaty, and is officially outside of it.

The European Community has recognized these difficulties before. In 1986, the ministers of foreign affairs and of justice agreed to establish a committee of top level officials from the member states, with representatives from the (European) Commission. This should promote cooperation between national police and judicial authorities. Thus there is also an *ad hoc* immigration working group where results already have been achieved in terms of granting visas to citizens of third countries. Rapid progress will be necessary in this area to make it possible to eliminate the remaining controls on the traffic of persons by 1993, according to the European Commission.[24]

Here two views about the future of Europe are at right angles to each other. This potential conflict has practical and concrete consequences for the development of the internal market: either the internal borders will remain or the internal borders will be eliminated. Either the internal market remains a system of national markets, albeit more easily accessible than is the case right now,[25] or the internal market turns the Community territory into a space without internal borders with free traffic of goods, persons, services, and capital, in the same manner as *within* a member state.

Prime Minister Thatcher left the door ajar. It is only after a few practical steps have been taken and the new regime has been functioning for a few years, that it will be possible to see what new measures could be taken.[26] In her opinion, the only possible way for this to work is on the basis of active cooperation among sovereign states. There would not be a central, "dirigist" European government in Brussels.[27]

This is seen somewhat differently in some places on the European continent, even in the relatively short term. A necessary result of the formation of the internal market will be intensive cooperation among the member states, among other things in the area of the fight against terrorism and against drug trafficking. This implies among other things a common policy on admitting citizens from third countries. Each of the member states will have to have a system of controls attuned to those in the other member states. This will eventually necessitate a form of central Community administration.

It may be that, given these fundamentally different views of the future of the Community, it will be up to European magistrates to make an important decision about this future. That would seem life threatening for the Community, because European unification must be based on more than "magistrate's law." If necessary, this opinion from the EC Court could be requested even before 1993. Then the Court would have to test the (possibly watered down) harmonization measures of the Community in the area of indirect and excise taxes against what is written in Article 8A of the EEC Treaty. As a matter of fact, this treaty provision mentions the measures necessary for the establishment of the internal market within the deadline of 31 December 1992 as stipulated in Article 8A. Several developments are possible in this respect.

First of all, that the miracle of February 1988 might be repeated and that the member states might start looking at the future of Europe in almost identical terms more quickly than is currently expected—and still just in time.

Secondly, the EC Court could stipulate that Article 8A calls into being an internal market without borders, and this effective January 1, 1993.

Thirdly, the EC Court could, pending greater unanimity among the member states, already decide that it is true that Article 8A in and of itself calls into being an internal market without borders among the member states, but that the deadline mentioned in the article (31 December 1992) is only a political target date, which could be moved back. The risk would then exist that the Europe of 1992 would become a reality only in the twenty-first century.

The Commission is aware of the danger of such a development and is trying to achieve a situation by the end of this decade where so many practical measures have been taken by the Community, that it would not be possible to turn back on the road to integration.[28] When would this be the case? To this effect it appears necessary that the announced tax and excise measures be taken in a timely manner. As noted earlier, decisionmaking in this area will come about via Article 99 of the EEC Treaty, and not by means of the new route of Article 100A or Article 149 of the EEC Treaty. The obstacle of the need for unanimity within the Council cannot be circumvented.

Schengen Agreement

The Schengen Agreement is a treaty between each of the Benelux countries, the Federal Republic of Germany, and France concerning the gradual elimination of controls at the common borders between these countries.[29] The treaty dates from 14 June 1985, has been temporarily implemented as of that date and became formally effective on 2 March 1986. This treaty was silently ratified by our parliament in accordance with the procedure of Article 91 of our Constitution. The Agreement provides both short- and long-term measures. There is a continuity among these measures in the sense that in further opening up the borders, public order and security must remain guaranteed.[30]

The Schengen Agreement did not come out of a clear blue sky. As early as May 1984, the FRG and France had, on the basis of their Friendship Treaty, made known their intention to make the traffic of persons less restricted. At nearly the same time, talks were being held among the Benelux partners to achieve further liberalization of the traffic of goods. The time appeared ripe for further steps in this area. The Agreement, which provided a first step toward liberalization and which since 1985 has been further implemented by the parties involved, also intends to be a stimulant to further integration within the broader context of the European Community. In principle, this Agreement is applicable to all EEC citizens on a nondiscriminatory basis.[31]

Nevertheless, questions have arisen as to the extent to which the further implementation of the Schengen Agreement is in keeping with corresponding regulations of the European Community. In this respect, there is first of all a political problem, which has already been mentioned above, specifically that taking away the barriers at the borders between the five countries participating in the agreement has direct consequences in noneconomic matters, such as the general judicial investigation and criminal prosecution policy of each of the countries in terms of the fight against crime (terrorism, drug trafficking) and the national visa and alien policy, because the country in question can no longer control what foreigners from third countries might travel from one of the other participating countries to their own territory. The gradual elimination of these controls at the common internal borders of the five countries involved in the Schengen Agreement requires the gradual coordination of policies concerning the fight against crime and alien policies. This raises quite a number of tensions. The FRG's antidrug policy, for example, is substantially different and is based on different policy insights than in the Netherlands. The same is true to a large extent of the alien policy and the national alien legislation, which has not been developed along the same lines in all participating countries.

Through four working groups, which will consist of upper level officials from the five countries, and by means of periodic consultations among responsible government leaders, they hope to achieve the further implementation of the Agreement before 1990.

This involves difficult problems of a primarily political-technical nature. What is even more difficult is the real bottleneck involved here: what is the relationship between the Schengen Agreement and the renewed EEC Treaty?

As was already indicated above, the political question of the moment is primarily the extent to which the EEC Treaty, renewed by the European Act, includes provisions for determining further political and noneconomic regulations on the loosening of the restrictions on national border crossings.

The Schengen Agreement implies that the border controls on the common internal borders between the five will be shifted to their *external* borders, which to a large extent are simultaneously internal borders for the member states of the Community. There is the risk inherent to such border controls that Schengen citizens and goods will be treated better than EC non-Schengen citizens and goods. Such discrimination would soon conflict with Community law, when the handling of persons and the traffic of goods within the framework of the European Economic Community is involved. The point of discussion, however, will be to what extent the European Community has the authority to issue community regulations with regard to noneconomic matters, such as border patrols, visa policy, alien policy and alien legislation, the right to asylum, etcetera, or whether in principle that authority still remains with the member states. In the latter case, the specific provisions of the Schengen Agreement will not conflict with Community law as yet, given that so far there is no Community law (*actes communautaires*) in that area. It may be that this law will come into existence in 1993 with the formation of the internal market, if Article 8A of the EEC Treaty is defined in that sense.

Similar difficulties, which could arise with the implementation of the Belgo-Luxemburg Economic Union and the Benelux statute, are absorbed as it were by Article 233 of the EEC Treaty. The provisions of the EEC Treaty are no hindrance to either the existence or the completion of these two regional unions. However, Article 233 does not apply to the Schengen Agreement, not even by way of analogy.

The matter is murky. There are a number of relatively old EEC guidelines about member state measures concerning aliens (from other member states!), which measures are justified for public order, public security, and national health.[32] Similarly, there is an EEC guideline concerning the lifting of limitations on the movement and residence of member state citizens within the community in terms of settlement and the rendering of services.[33] However, these regulations relate to actions by persons within the framework of the EEC Treaty.

What would be more difficult is if the Schengen Five were to want to conduct their own alien policy and thus develop their own concept of "alien" as a person who is not a citizen of one of the participating countries. Such a policy would probably be contrary to Community law, which prohibits all discrimination related to nationality among the EC member states.[34] The question will be whether the Schengen Five will be able to get their own effective alien and visa policy off the ground at the "external borders of Schengen," if such a policy must be based on the community concept of "alien" being a person who is not a citizen of one of the member states of the Community. The Schengen Five will take the political position that they have the authority to implement the Agreement, as long as these specific regulations relate to authorities still in the hands of the member states, or go beyond an already existing minimum Community regulation. The assumption is made here that the specific provisions based on the Schengen Agreement will remain applicable only until community measures further regulate this specific area.

Conclusion

What does all this mean? What is the relationship between the formation of the internal market of the Europe of 1992 on the one hand and the implementation of the Schengen Agreement on the other hand?

If Prime Minister Thatcher is proven right and the internal market does not result in the elimination of barriers at the internal borders of the Community, because the authority of the Community does not (yet) go so far as the creation of coordinated measures in the area of state security (the fight against crime) and the visa and access policy of the member states with regard to aliens from third countries, then the Schengen Agreement would seem acceptable and an incentive by the Five toward more integration within the Europe of the Twelve. In that case the Agreement could also be applicable after 1992, under certain strict conditions, until the Community has rallied once again in these specific political areas and is able to take over the task of the Schengen Agreement.

If security controls, immigration policy, and the like, related to the implementation of the internal market no longer belong to the field of the member states but to the authority of the Community, then it would be plausible that the regulations for the implementation of the Schengen Agreement would soon be contrary to Community law.

The core of this politically sensitive question appears not to have been solved as yet. And there is as yet not a *communis opinio* either. For the time being, the Schengen Five are proceeding on the road they have taken. Thus, they run the risk that the European Commission, a "third" member state which does not belong to the Five, or a citizen will request clarification from the EC Court about the consistency of the specific provisions involved in the implementation of the Schengen Agreement and Community law.[35] A risk, because it is possible that a few of the Schengen regulations would not pass muster in terms of community law and because of their contradiction with Community law are already nonbinding *ab initio*. If citizens of other member states were to have suffered damage because of this, then they might be able to recover the damages from the country involved, which implemented the prohibited Schengen regulation. More important than this risk would be that the building erected by the Five during the past and coming years, would once again have to be dismantled.

There is the danger that in some areas where there is uncertainty as to the distribution of community authority, the Five might thus put the horse in front of the cart.

International Affairs

* Problems in EEC/EFTA Trade Relationship

36200089 Zurich NEUE ZUERCHER ZEITUNG in German 31 Dec 88 p 16—FOR OFFICIAL USE ONLY

[Article by Hans Mayrzedt: "Western Europe's Common Market—Without EFTA States?"]

[Text] The EC's efforts to implement its ambitious Common Market program on schedule has kept it so busy that until now there has not been time enough to devote to remodeling its foreign relations. This has in like measure affected the EC-EFTA relations, which had in the past been considered to be privileged. However, there should be greater emphasis on the time available for the EFTA states to develop their own conceptions. Their respective governments have made little use of this time to date.

Strategic Similarities

Among the EFTA countries there is a somewhat vague consensus with respect to the EC Common Market program, to participate in this program "as far as possible." Beyond that, hope is expressed in some EFTA states that extensive, or even full Common Market participation, is possible even without membership in the EC. For that, they make reference to the postulate of a "dynamic, European economic area," made jointly by the EC and EFTA states in Luxembourg in 1984. There are many reasons for maintaining such hopes; but they require detailed discussion to determine their validity.

The differences between the respective attitudes of individual EFTA states are smaller than would appear at first glance. There appears to be considerable willingness in all EFTA countries to approach the EC closely. Only two among them, Switzerland and Finland, are at present firmly opposed to becoming members "within the foreseeable future"—whatever that means. Norway and Sweden, on the other hand, appear to visualize eventual EC membership resulting from continuing rapprochement, while Austria prefers to take a single "qualitative leap." It is being said that whenever Austria formally applies for membership, integration policy would be reevaluated in Norway and Sweden; this would in any case strengthen the position of those in favor of joining. However, inasmuch as there continue to be considerable domestic policy obstacles in Norway toward an offensive integration policy, a lot will probably depend upon future Swedish attitudes.

Switzerland is in a special position inasmuch as its pragmatic policy, which has led to many agreements with the EC, has been very successful. However, Christian Lutz recently challenged continuation of this policy with a "Plea for a Total Package" (NEUE ZUERCHER ZEITUNG No 288). Apart from a factual basis for this approach, I believe that Switzerland cannot shirk its responsibility for active participation in forming the West European economic area in view of its own economic situation.

Questionably Realistic

Lutz specifically asks that Switzerland set for itself "the goal of full participation in the Common Market, to include abolishing border controls." All other EFTA states might follow suit on this. The crucial question is however whether this goal, as Lutz advocates it, can be achieved without membership in the EC and/or "without participation in the EC decision making process." If so, the question of EC membership would lose some of its urgency for EFTA states. Unfortunately, there are great obstacles in the way of this proposal.

Even in the past EFTA states have had to contend with discrimination in the EC, which is partly inherent in the system and partly deliberate on the EC side. An example of system immanence is discrimination resulting from the free trade zone, which is based on basic regulations; or that resulting from nonmembership in the EC Agrarian Union; this results in concomitant problems for agricultural processed goods. The complexity and restrictive language of the basic regulations intensify the discrimination against products from EFTA states beyond the extent dictated by system immanence.

The same is generally true of the EC Common Market program. To implement a free flow of trade, all customs inspections, toll gates and "technical barriers" are to be eliminated on the borders between EC states. Also to be abolished are all deficiencies in services, capital turnover, and freedom of movement of enterprises, as well as passport controls at the inland borders. A program of this nature can be implemented only if state regulations are replaced by community regulations. Their adoption would probably be insufficient for the EFTA states. While the new EC harmonization concept is a lot more flexible than the previous approach, it does as a result require occasional legal evaluation by the EC Commission or the EC Court of Justice. The weakness of a unilateral overtures by the EFTA states to the EC becomes particularly evident at the tax barriers: they are to be abolished at the borders between the EC states, by bringing indirect tax rates into near unison and directing payments to the member states through a clearing institution. Only member states can participate in such a clearing operation.

Autonomous approaches by the EFTA states and agreements can serve to ameliorate the problems, but cannot really solve them. Additionally, some of the EC states once again appear to show intentions of reinforcing internal solidarity by creating an external distance well beyond the dictates of necessity. Unfortunately the main motive for promoting the EC Common Market program, to deal with external challenges, mainly by Japan, appears to be relegated to the background in the EC states. If this motive were to be taken more seriously, the EC should welcome the EFTA states with open arms in whatever form.

As a result we must conclude that without EC membership there cannot be full participation in the EC Common Market program. In particular, participation in the Common Market program without sharing in the decision process does not appear useful.

The Political Vision

Next, we must face the question whether the political objective of the EC has gained in substance and credibility. According to the Brussels Doctrine, it is to be a continuous process, which is to be accelerated by the Common Market program and the Unified European Document. I believe, however, that a majority of political scientists no longer consider this approach tenable. Increasing attention is being paid to the belief, formulated some time ago by Dahrendorf, that the EC is unsuitable for a genuine political unification process, even considering the Unified European Document, and that to achieve it, a new approach is required, as repeatedly called for by the European Parliament. Is this unrealistic? Perhaps. Is the other approach more realistic? Hardly. At the current juncture of integration policy development, there is a need for statesmen, who could prevail against heavy resistance by ingrained thinking and power cliques. There is no sign of this at present, but it may be possible within the next 20-30 year timeframe.

In view of this, should a neutral state like Austria indeed muster the strength to apply for EC membership, it would, even without wanting to, fall heir to the thankless task of challenging the EC to its "moment of truth."

At present, however, there would not seem to be much interest in this within the EC. It has been said that a candidate for membership would have to subscribe to the Community treaties and the European Document, but that it is "doubtful" whether participation by a neutral state in European political cooperation is indeed desirable. Application for membership by a neutral state would therefore be all the more reason for a review of integration policy strategies, whereby it would hardly be possible to avoid debates about the credibility of neutrality.

Within the EC there seems of course to be a tendency in matters of integration policy to have the neutrals "sit in the corner." This shortchanges some higher-priority aspects of European policy. The status of the four neutral EFTA states, apart from the Western Alliance, doubtlessly represents a contribution to the European system of equilibrium and security, which is of benefit to the EC also. This contribution is significant also in the context of EC intentions for improving relations with the COMECON states as well.

In the overall picture, there is no harm at the present time for EFTA states to use individually different approaches for their overtures to the EC. On the one hand, their initiatives could complement each other. On the other, the potential for implementing EC-EFTA relations could be augmented. In any case, the objective of full participation by all EFTA states in the EC Common Market, for the short or longer term, should be maintained.

NEWSWEEK, OCTOBER 31, 1988, pp.32-34

INTERNATIONAL

Who's Afraid of 1992?

The European Community is beginning to face up to a fateful year

BY SCOTT SULLIVAN
European Regional Editor

Andre Ferre worries full time about the watershed known as "1992." As the owner of a small but prosperous horticultural firm in Brittany, he imagines that in four years Spanish nurseries will be flooding France with cheaper fruit-tree stock. "If our government doesn't do something to help, and quickly," he says, "our whole profession could be wiped out." As mayor of Asserac, a village of 1,132 inhabitants on Brittany's rugged south coast, Ferre also fears that his commune may miss out on the post-1992 boom in European tourist trade. "If Asserac has something special to offer to our British and Dutch visitors, we will thrive," he says. "If not, we'll remain a backwater forever."

The fact that André Ferre has even heard about 1992 is striking. A year ago the European Community's plan to initiate a "single market" by Dec. 31, 1992, was a vague and not-quite-credible notion for most Europeans. In the last few months, however, the vision of 1992 has seized the popular imagination. It dominates dinner-party conversations from Athens to Edinburgh. It has spawned thousands of seminars and discussion groups. It is accelerating Euro-mergers by the hundreds. But as the prospect of a true common market becomes more credible, it is also evoking anxiety and opposition. Like Ferre in the boondocks of Brittany, millions of Europeans—and all the Community's trading partners—now realize that the single market will revolutionize Europe. It will be difficult to achieve, given the vast economic differences among the 12 member nations (map). And it will produce losers as well as winners.

'Infernal market': Late last month doubts and concerns about the 1992 project burst into the open. In a major speech in Belgium, Britain's Prime Minister Margaret Thatcher attacked the EC's executive commission for seeking what she called a surrender of sovereignty to Brussels. French Prime Minister Michel Rocard said that the harmonization of European consumer taxes, which the commission claims is essential to the single market, would "pauperize the [French] state." Karl Otto Pöhl, president of the Bundesbank, came out against the creation of a European central bank, another pet commission project. American trade officials, who worry that Europe after 1992 may become more protectionist than ever, started referring to the coming internal market as "the infernal market." Japanese officials began to complain openly that the gathering body of 1992 Euro-regulations could close the EC Market to Japanese goods.

Government officials are not the only objectors. West German truck drivers plan to stage strikes to protest the coming Community-wide deregulation of their heavily protected industry and the likely loss of some 10,000 jobs there. European employers' groups are fighting commission plans to write a new "European company law" that would ensure Euro-company employees a say in major business decisions. At the same time, trade-union leaders are lobbying in Brussels against what they describe as the emergence of a "businessman's Europe," which would do nothing to advance workers' rights. Danish ecologists fear that their country's strict environmental legislation may be "harmonized down" in the cause of uniformity. British animal fanciers dread the thought that, once frontier barriers are down, rabies and hoof-and-mouth disease may spread from the Continent to the United Kingdom.

Noisy as it is, the current criticism of plans for 1992 has emerged against a background of solid support for a new "Europe

FOSE
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3 FERMES
DEMAIN COMBIEN
BESOI

Winners and losers: *Farmers protest proposed European agricultural trade policies in*

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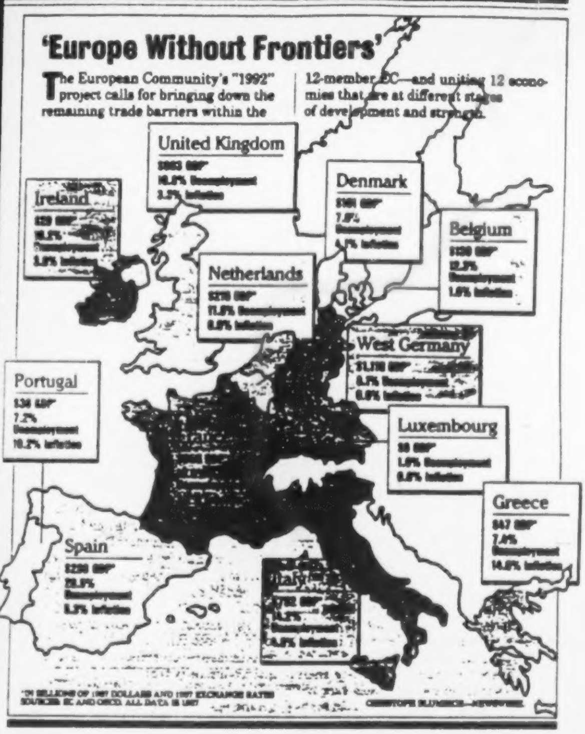
JEAN GUYAUX CAVENDISH—REFLEX PICTURE GROUP

LELOUP—COLLECTIF J.B. PICTURES

Strasbourg, Thatcher (top), Delors

'Europe Without Frontiers'

The European Community's "1992" project calls for bringing down the remaining trade barriers within the 12-member EC—and uniting 12 economies that are at different stages of development and strength.



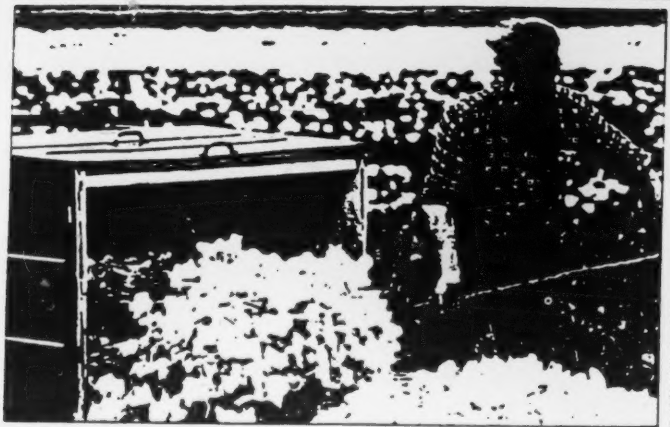
*IN BILLIONS OF 1987 DOLLARS AND 1987 EXCHANGE RATES
SOURCES: EC AND OECD. ALL DATA IS 1987

CHRISTOPHE BLUMRICH—NEWSWEEK

without frontiers." Every EC political leader, including Thatcher, is committed by treaty to the 1992 project. Polls of businessmen from every European country show big majorities favoring the single market. In France, 76 percent of presidents of small and medium-size companies are optimistic about 1992, even though they are more vulnerable to outside competition than larger firms are. "Europhoria" is still the dominant mood in the Community. Even so, the withering criticism of key components of the package could make it impossible to achieve a single market by the psychologically crucial deadline date.

Pragmatic attack: Of all the doubters, Thatcher is the most incisive. What she and her colleagues authorized nearly three years ago, she says, was a pragmatic attack on the remaining barriers to trade and services in Europe. In the hands of the Brussels Eurocracy, this has now become 285 enormously complex regulations, covering subjects that range from trade in bull semen to new rules for banks and insurance companies throughout Europe. Moreover, Jacques Delors, the French socialist who is president of the EC Commission, calls for further changes, including a powerful European central bank and a common currency. Neither has anything to do with the 1992 project, says Thatcher; they should not confuse the debate.

Even rabid Europeanists admit that Thatcher has helped clarify the issues. "Everything is out in the open now," says Peter Ludlow, director of the Center for European Policy Studies in Brussels, though he dismisses Thatcher in the next breath as "a more and more marginal figure" in the EC leadership. Thatcher has fixed the parameters of the debate, however. She has demonstrated that some of the proposals now up for discussion go far beyond the practical goal of a single market. She has identified the main issue: the conflict between the



DE KAM—HOLLANDSE HOOGTE

No market without the workers' backing: *Picking tulips for export in the Netherlands*

sovereignty of individual nation-states and the dream of a European federation.

There are daunting practical problems, too. One of the toughest is the wildly different value-added and excise taxes among the 12 members. A bottle of whisky is taxed 36 times more heavily in Denmark than in Greece. French consumers pay a 28 percent "luxury tax" on new automobiles. In the United Kingdom, baby clothes, food and books are not taxed at all. The EC's executive commission says these differences are a prescription for chaos. Crowds of Danish shoppers will cross the German border, where lower taxes on goods mean lower prices. French consumers will buy their Renaults and Citroëns in Brussels. Low-tax countries will prosper, some firms in high-tax countries will go under.

Labor law: Equally difficult is the issue of whether and how to provide a special statute for "European companies." For decades, European businessmen have urged the creation of a formula that would allow Europe-based multinationals to do business under a single body of commercial law. European labor unions agree, seeing standardization as a heaven-sent opportunity to broaden and extend employees' rights throughout the Community. Ideally, they would like to see the new law reproduce West German labor law, under which workers have a right to elect between a third and half of the members of their companies' supervisory boards. Predictably enough, Mrs. Thatcher hates that idea, which she dismisses as "social engineering." But, warns Ernst Breit, leader of the federation of West German labor unions, "there will be no single market unless it has the backing of the workers."

Health and safety standards are another emotional issue. Danes, who take pride in the toughest rules anywhere in the EC, are resisting what they see as the Community's drift toward the lowest common Euro-denominator. They fear, for example, that supermarkets in Copenhagen may soon stock toys manufactured cheaply in one of the southern EC countries and decorated with lead paint. Last month Denmark won an important victory in the European Court of Justice when the judges upheld a Danish law banning imports of soft drinks and beer in plastic bottles. The decision seemed to indicate that a member-country could protect its citizens' safety and the environment even at the cost of restraining intracommunity trade.

But that flew in the face of the principle behind most 1992 legislation: "mutual recognition of norms and standards." The general idea is that if a product is manufactured in England and declared safe for English consumers, it can be sold anywhere in the Community. The approach follows a 1987 judgment by the European Court, which struck down a 470-year-old German statute banning any additives in beer—a law German brewers had clearly exploited to stop imports from their less fastidious French competitors. Clearly, "mutual recognition" is a simpler administrative process than getting 12 different countries to agree on, say, the definition of "white bread." A high-level community working group spent five years on just that subject before giving up and declaring that white bread was anything so designated in the country where it was baked.

Mutual norms are also at issue in one of the EC's bitterest debates: how much "European content" there must be for a given product to count as European. The United Kingdom contends that a Nissan car produced in England with 60 percent British-manufactured components should benefit from all the advantages of a free internal market. The French government, along with Renault and Fiat, claim that any car with more than 20 percent of components from outside the EC should be taxed as though it were Japanese or Korean.

—Such arguments worry the Twelve's traditional external trading partners. The Japanese fear that very low quotas for Japanese cars in some Community countries—3,500 vehicles a year in Italy, for example—may spread throughout the EC. Non-Community Europeans like the Swiss and the Swedes are concerned about losing the excellent access they currently enjoy. And while Horst G. Krenzler, director general of the EC external trade divisions, says that "the idea of a 'Fortress Europe' is simply absurd," Jacques Delors did raise eyebrows when he said recently, "We are not building a single market in order to turn it over to hungry foreigners."

Step briskly: There will be losers inside the Community as well as outside. Firms that enjoy monopoly positions in their own markets and have little export experience are in danger. Size is no protection. The vast Fiat automobile company is likely to lose a chunk of its domestic market simply because it now sells six out of every 10 cars registered in Italy. Germany's rich, powerful banks and insurance companies will have to step briskly to compete with their more flexible and aggressive British competitors. Most seriously threatened are the fragile economies of the Mediterranean sun belt. With some exceptions, industries in Greece, Spain, Portugal and Italy's Mezzogiorno produce lower-quality goods than their northern competitors do. They are less efficient. Their one competitive advantage consists in lower labor costs and lower fringe benefits, and that edge will be eroded as the Community strives to harmonize working conditions and workers' rights.

Clearly, Europe will not give up protectionism and social engineering overnight. While EC officials maintain in public that their proposals are nonnegotiable, they are fully aware that the single market will be a patchwork creation. But it will happen. Even the most rabid critics of various elements in the 1992 package say they support the idea of a single European market with 320 million consumers. Its time came long ago. The fact is bound to follow. Opposition will grow stronger, not weaker, as 1992 approaches. The path to a single market will be paved with sloppy compromises and missed deadlines. Inevitably, though, a Europe without internal borders will emerge. Europe's economies need it to compete and survive. And it is the absolute pre-condition for accomplishing the long-term European dream: a real political union that will restore Europe to its role as a world power.

Washington Post, October 31, 1988, pp.A13,A18

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Thatcher, Europeans Squabble Over Integration Set for 1992

By Karen DeYoung
Washington Post Foreign Service

"[I have not] rolled back the frontiers of the state in Britain, only to see them reimposed at a European level."
— British Prime Minister Margaret Thatcher

LONDON—When the plan to abolish all trading barriers inside the European Community was launched in June 1985, it sounded like a good idea. Integration, after all, was what the community was supposed to be all about.

But as the December 1992 deadline for implementing the changes draws closer, differing perceptions of what integration means, and how much of it is desirable among sovereign nations, have started a noisy and potentially destructive squabble within the 12-member group.

The United States and Japan, the EC's biggest trading partners, have their own worries about a fully integrated community, fearing they will be locked out of a protectionist "Fortress Europe."

But the West Europeans say they have no plots to gang up against the rest of the world. What concerns them far more these days is whether they will even be speaking to each other by 1992.

As usual, the internal battle lines are drawn between British Prime Minister Margaret Thatcher and the rest of the community.

Since the early 1980s, Thatcher has hectored and lectured her fellow European leaders on everything from the community budget to farm surpluses. Although she has emerged victorious on a number of issues and earned grudging appreciation for helping to focus EC debates, she has also built a reputation for intransigence and a store of personal enmity among some leaders.

Over the past three months, much of that dislike has come out in the open as Thatcher has turned her attention to the subject of 1992.

In speeches, interviews and news conferences, Thatcher has launched assaults against what she calls the "airy-fairy" notion of a "United States of Europe," and railed against those "who see European unity as a vehicle for spreading socialism."

Her most frequent target has been European Commission President Jacques Delors, with whom Thatcher has been carrying on an exchange of public insults since last July. It began when Delors suggested to the European Parliament that the EC was looking forward to the creation of an "embryo European government," which would take over 80 percent of economic and social decision-making from European capitals within 10 years.

Thatcher, in a radio interview, responded that such a supranational European government would "never come in my lifetime and I hope never at all. I think he was wrong. I think he went over the top. . . . I think it was quite absurd."

The dialogue has gone downhill since then. Thatcher infuriated her fellow European leaders last month when she told a European gathering in Bruges, Belgium, that she had "not successfully rolled back the frontiers of the state in Britain, only to see them reimposed at a European level, with a European superstate exercising a new dominance from Brussels."

Last Wednesday, Delors demanded that Thatcher produce proof of her charge that the EC bureaucracy at Brussels headquarters was exceeding its authority. Warning against those who "provoke unnecessary new ideological confrontations," Delors said that "misunderstandings must be put aside as quickly as possible, so as to avoid pointless dramatization and . . . a crisis between member states."

EC members are Belgium, Denmark, France, West Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Spain and Britain.

To Thatcher, 1992 amounts to a good business opportunity for Britain, with the elimination of existing red tape that now makes it difficult for goods and services to pass freely across community borders. Her definition of full integration, a senior aide said, is "the much closer working cooperation of 12 independent states operating as a single market."

What Thatcher has repeatedly made clear she does not want is a "federalized" Europe, with a common currency and central bank, common labor laws and common policies for dealing with the rest of the world in nearly all areas.

Much of Thatcher's attack on Delors has been interpreted by her fellow community leaders, and some British commentators, as bordering on the personal. "Mr.

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(continued)

"Misunderstandings must be put aside as quickly as possible, so as to avoid ... a crisis between member states."

— European Commission President Jacques Delors

Delors is an intellectual, a bureaucrat, a socialist and a Frenchman, which puts him pretty high on this prime minister's list of undesirable persons," columnist Peter Jenkins wrote here.

As the exchanges have become more outspoken, other government heads have jumped into the debate on Delors' side, insisting that a unified, federal Europe is the only way for them to remain strong and competitive into the next century, and is precisely where the EC should be headed.

The ultimate EC goal, Belgian Prime Minister Wilfried Martens said in a news conference called to rebut a Thatcher broadside, is "common sovereignty over foreign policy, defense and security, monetary, economic, environmental and social policy." Thatcher, he said late last month, "initiated this debate about the future of Europe. It is up to all the other European leaders to make it clear where they stand."

A number of them have done so. West German Chancellor Helmut Kohl, in an Oct. 17 speech to Catholic politicians gathered in Brussels, said that the building of a single European market was but an evolutionary step toward a supranational Europe that would include "an economic and monetary union," with an added "social dimension." The Netherlands and Luxembourg said they agreed.

Greek Prime Minister Andreas Papandreou has called on Thatcher to explain herself. Thatcher and Spanish President Felipe Gonzalez had what she described as a "splendid, first-class argument" about Europe when she visited Madrid last month.

When Thatcher traveled to Italy last week, Prime Minister Ciriaco De Mita told reporters that "in my opinion, and I believe in the opinion of most European governments," full economic and political union "is the direction to move in." Britain and its community colleagues, he said, "have some difficulty in understanding each other."

French Prime Minister Michel Rocard told interviewers this week, "I am clearly a European federalist." A European central bank, he said, is an "absolute necessity."

In fact, much of the debate is an academic one for the moment, since few of the approximately 300 new provisions that make up the 1992 package address the kind of supra-European social, political and economic dimensions that Thatcher rejects and her colleagues promote. The vast majority deal with nuts-and-bolts issues like community-wide harmonization of product standards and professional qualifications and regulations, and standardization of customs documents.

So far, only about a third of them have been approved, or even discussed, by the community's ruling Council of Ministers.

The subjects of the most angry arguments are largely at the stage of theoretical discussion as long-term objectives rather than substantive proposals for the 1992 deadline. At the same time, some of the most outspoken "Europhiles" are not as committed to total integration as their statements—designed for domestic consumption—would indicate.

Kohl's advocacy of the "social dimension" to integration—in the form of common labor laws that would spread West Germany's system of worker participation in management throughout the community—is largely a function of his Christian Democratic Union's desire to avoid alienating German trade unions.

Although Kohl, and more so his foreign minister, Hans-Dietrich Genscher, have backed a future European central bank and a common currency—neither of which is part of the 1992 package—the powerful president of the West German Bundesbank, Karl Otto Poehl, is opposed.

In France, where Europeanism is practically a state religion, Rocard caused a stir this week when he told interviewers that his government had problems with vague EC proposals to "harmonize" value-added taxes (VAT) that vary from zero to 38 percent from country to country.

Officials of Denmark and Ireland, which stand to lose substantial revenue if forced to lower their high VAT rates, are also concerned.

Like her European colleagues, Thatcher is in part playing to her domestic audience. While it may be impolitic to be anti-Europe on the continent, it is equally

See EUROPE, A18, Col. 4

EC 'Integration' Fuels Squabble

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inadvisable for any British leader to be too European in this jingoistic island nation.

Many in her Conservative Party agree with her vision of an "Atlantic Community," in which Britain occupies some midoceanic, preeminent position as the bridge between the United States and the EC, rather than simply serving as part of a homogenized Europe.

At the same time, her "anti-Europe" offensive is an opening salvo in the campaign for elections to the European Parliament next June, when Thatcher hopes to install more delegates in line with her own thinking.

Not everyone in Thatcher's government is happy with her European onslaught. Foreign Secretary Geoffrey Howe, who is known to have cringed at some of her more provocative comments—and tried in vain to head them off—has spent much of his time in recent weeks seeking to calm ruffled European sensibilities behind the scenes.

But Howe knows that others who have stuck their heads more openly above the parapet have found themselves decapitated. Lord Cockfield, a Thatcher appointee to the European Commission and the author of most of the 1992 program, asked in a speech in July whether Britain would "continue down a path . . . of limited vision, grudging participation and thereby restricted benefit from the future development of Europe."

Within a week of those remarks, the government announced that Cockfield's current four-year commission term would not be renewed when it expires in January.

Thatcher aides maintain that many European leaders are privately pleased that she has "crystallized" the issues. "The prime minister has been very instrumental" in clarifying the debate, said one.

The prime minister herself noted in a triumphal speech to the annual Conservative conference last month that her comments on Europe had "caused a bit of a stir. Indeed, from some of the reactions, you would have thought I had reopened the Hundred Years War. And from the avalanche of support, you'd have thought I'd won it single-handedly."

But such support—public or private—is difficult to discern, as her fellow government heads seem to have gone out of their way to publicize their disagreements with Thatcher.

Some of the disputes deal with the specifics of the 1992 package. Thatcher, for example, has rejected a plan, which others say she had already agreed to, to remove all internal customs barriers in the community. In what is interpreted as yet another insult, she has implied that what she sees as Britain's tight control over the entry of drugs and terrorists here cannot be matched by the careless continent.

But whether the disagreement is over substance, or the idealized concepts of future full integration, what the others say they object to most is Thatcher's tone, and the implication that anyone who does not share her own view of what Europe should be, including conservatives such as Kohl, is tainted with suspect socialist ideology.

Even Britain's own Daily Mail, normally the most servile of Thatcher supporters, noted recently that "she carries herself in relation to the Common Market like some disdainful reincarnation" of the late French president Charles DeGaulle, who was noted for his unusually high degree of intransigence.

"It was in his day a magnificently chauvinistic view," the paper noted. "But the general has been dead for a good few years, and we are now looking to 1992 and beyond, when the economic barriers between our countries are swept away so that together we can go forward in prosperity and strength."

Economic Viewpoint

THE U.S. SHOULD APPLAUD THE COMING OF EUROPE INC.

BY ROBERT KUTTNER

Some U.S. officials fear a new 'Europrotectionism' will emerge in 1992 along with a true common market. But the changes represent exactly the sort of liberalization Americans have urged on Europe for decades

The European Community has embarked on an ambitious program to eliminate all remaining barriers to a true common market by the year 1992. In principle, the 12-member EC is already a single market. No national tariffs or import quotas remain, and the member nations abide by a Common Agricultural Policy of price supports and production management. In commerce, European nations have already ceded substantial sovereignty to the community.

But a number of more subtle barriers have continued to make the community a less-than-fully common market. These include a crazy quilt of national inspection laws, technical standards, regulatory regimes, and industrial policies that in practice make it almost impossible for German companies to sell phones to the French telecommunications monopoly, or for the Dutch to market life insurance in Britain. Although Europe is nominally a customs union, truckers still must undergo anachronistic long waits at national frontiers while their cargo is inspected by customs officers.

Removing these remaining barriers will require painstaking negotiation, product by product and regulation by regulation. Ultimately, the goal is to have communitywide standards and regulatory schemes to replace the national ones that now exist. For many countries long accustomed to practicing economic nationalism, the liberalization that goes with a pan-European market amounts to both hazard and opportunity. It offers the prospect (and the competitive discipline) of selling to a much wider market. But it also brings the risk that one's domestic companies will lose market share.

LEERY OF THE FUTURE. This risk, however, the statesmen and stateswomen of Europe are willing to bear—both because of the net gains to economic efficiency and because of their long-term commitment to the idea of Europe. To maintain the forward momentum toward a politically united Europe, the promise of a common market must be kept.

Paradoxically, dissent is coming from another quarter: the U.S., whose officials say they are leery of 1992 because they fear that it will bring a new form of "Europrotectionism."

Superficially, this is true. Rigid and nationalistic country-by-country policies are giving way to pan-European standards. And these standards may turn out to be something short of totally free trade. As national subsidy programs assisting depressed regions give way to continentwide programs, these by definition favor European regions over non-European ones. To take another example, at present every European nation has fairly tight import quotas limiting Japanese auto sales. In 1992 these will undoubtedly be folded into a communitywide quota—though in all likelihood a more liberal one.

By the same token, the Europeans have decided to subsidize development of a domestic, pan-European semiconductor industry, intended to compete with U.S. and Japanese companies. As a response to Star Wars, the Reagan Administration's Strategic Defense Initiative, the European governments launched an applied-research program in advanced technology known as Eureka. Their concern was that the U.S., under the guise of national security, would monopolize research in the most advanced technologies. But in all of these cases and several others, continentwide policies are replacing far more rigid and nationalistic country-by-country policies.

PATERNAL PRIDE. So while 1992 does not promise absolutely free trade, it surely promises freer trade, in just the way the U.S.-Canada Free Trade Agreement does. If covert barriers are eliminated to make it easier for British insurers to market products in Germany, this also makes it easier for U.S. companies to market in Britain. Moreover, the Europeans also treat foreign-owned companies with European facilities, such as IBM Europe, as full-fledged European companies and let them participate fully in the various research consortiums. In a sense, 1992 really allows European business for the first time the advantage of pan-European marketing—something U.S. and Japanese companies selling in Europe have long enjoyed.

Instead of carping about "Europrotectionism," Washington ought to express some paternal pride in the promise of 1992. It is exactly the sort of liberalization that Americans have urged on Europe for decades, even if it retains more government involvement in the economy than some American ideologues would like. Since World War II, Western Europe has enjoyed a civil peace purchased through social partnership, and Europe simply will not give that up, even as it liberalizes its economy.

The peaceful economic unification of Europe is one of history's great cooperative feats. Forty years ago, when the great builders of Europe were commencing their labors, farsighted Americans were cheering them on. Americans can take some vicarious pride in Europe's economic unity, which came in part with American tutelage. And if Europe manages to liberalize its economy while still retaining a degree of public planning and social justice, so much the better. Indeed, that is where the Europeans have much to teach us. ∎

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New York Times, October 23, 1988, sec.3, pp.1,24

The Growing Fear of Fortress Europe

When internal barriers come down in 1992, will the U.S. and Japan find new walls to keep them out?

By STEVEN GREENHOUSE

BRUSSELS

THERE is a magnificently simple vision behind the European Community's plans to remove internal trade barriers in 1992: help the 12-nation community grow faster by encouraging more competition and efficiency.

But companies based outside Europe are starting to get a dark and clouded vision of 1992 — they fear that as Europe tears down its internal barriers to form a single, unified market of 320 million people, it might erect higher protective walls to keep competitors out.

Fortress Europe may not be here yet, but many American and Japanese officials and executives say that through import quotas, antidumping actions and requirements of reciprocity, a fortress just might be taking shape, brick by brick.

"What's important is that Europe not become free traders internally and protectionist externally," said Clayton K. Yeutter, the United States trade representative. "That's where the jury is out right now."

Fears about Fortress Europe have grown so intense that last Wednesday senior officials of the European Commission, the community's executive branch, called a special news conference to reassure trading partners and to deride the fears as "senseless and groundless."

But the commission's assurances did little to alleviate the anxiety. Although American and Japanese officials say it is not too late for the commission to keep Fortress Europe from being built, they say the evidence pointing to construction of a European fortress has been piling up:

- The commission has drafted a rule that could prevent foreign banks from setting up shop in Europe unless their home country grants "reciprocal" opportunities to European banks. This could mean that an American bank might not be able to obtain a license to operate in all 12 community nations because European banks do not have the right to open in all 50 states.
- France, Italy, Spain and Portugal all have national quotas limiting the number of Japanese cars that can be sold each year, and the European car industry has recently called for replacing those restrictions with a single quota. The European Commission is considering the proposal, which would roll back the number of Japanese cars sold in Europe to the levels of three years ago.
- Last month, the European Community slapped dumping duties on many Japanese and South Korean video cassette recorders, just one of the many penalties the community has ordered recently on billions of dollars worth of Asian goods. The Japanese insist that these penalties, which have even been placed on some

Continued on Page 24

What Europe Buys

The top 10 imports of the European Community in 1987, in billions of dollars.

Petroleum products	$55.7
Office equipment	19.0
Apparel and accessories	16.7
Road vehicles, including cars	16.5
Electrical machinery and parts	16.1
Telecommunicatons equipment	12.8
Textile, yarn and fabrics	10.6
Paper and paperboard	10.5
Fruits and vegetables	9.5
Plastics and artificial resins	9.3

Source: European Commission of the European Community

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Continued from Page 1

products that Japanese companies make in Europe, stretch international dumping rules much further than is warranted.

- Recent proposals to allow more competitive bidding in government procurement have caused American and Japanese companies to worry that the doors will not be open to them. Some non-European competitors find that the only way they can win contracts in certain nations is to build a plant or buy a company there.
- The European Community appears to be on a collision course with the United States over its refusal to import American meat that contains growth hormones. The Europeans say they are motivated by health concerns while Washington contends that the refusal is protectionist and violates a European agreement to buy American meat. The United States has threatened to retaliate against some European goods on Jan. 1.

Heated Exchanges, Talk of Retaliation

The 320 million people in the European Community make it the industrialized world's largest bloc of consumers, so a surge in protectionism in that huge market could seriously hurt American and Japanese companies, not to mention distort world trade. What is more, as the exchanges between the Americans and Japanese on one side and the Europeans on the other grow increasingly heated, so does the talk about trade retaliation.

European officials strenuously deny that they are scheming to build protectionist walls, moats and parapets to insulate their industries. Indeed, they angrily insist that their countries are no more protectionist than the United States or Japan — and that 1992 will not make them any worse.

"Why should the European Community — which is the No. 1 trading power in the world, which represents more than 20 percent of all trade flows in the world — why should such an entity turn protectionist?" Willy de Clercq, the European Community's trade minister, said in an interview. "When you're the biggest exporter in the world, you don't turn protectionist. That would be shooting yourself in the foot."

And there's a lot of foot to shoot. The European Community exported just under $400 billion in goods last year, 60 percent more than what the United States exported and nearly double Japan's exports. The community's imports are also huge, totaling just under $400 billion as well, roughly equal to the American import volume and more than three times Japan's volume. One goal of the 1992 program is to expend Europe's exports by reducing the costs of European companies — a goal that increased protectionism could well undermine.

Nonetheless, American and Japanese officials and executives say some European companies are pushing — some quietly, some openly — for protectionism, and the reasons are obvious. The companies, they say, have been cosseted for decades and fret that aggressive American and Japanese giants will grab a larger share of the European market in the free-for-all that will follow the lifting of internal barriers in 1992.

Many Europeans are already worried about how swiftly American giants like Citibank, American Telephone and Telegraph and Dow Chemical are moving to increase their European presence.

"There is a real risk that Europe will turn into a protectionist entity as 1992 comes more and more into being, regardless of the stated aims," said Alfred H. Kingon, the United States Ambassador to the European Community.

While Washington and Tokyo wrestle with the community, the Europeans are locked in their own dispute about protectionism. Free-trade countries, most notably West Germany and Britain, are eager to make their post-1992 world as nonprotectionist as possible, relaxing even the existing barriers to outsiders. But officials from some nations, including France, Italy and Spain, hope to preserve many of the old barriers and possibly erect new ones while their industries struggle to become more competitive.

American and Japanese officials are hoping, of course, that the free traders will win and that European officials will adhere to the goals of 1992. Those goals — most of all faster growth — are praised by the Americans and the Japanese, who say that if Europe grows faster it could buy more goods from abroad. Indeed, Mr. Yeutter and other foreign officials say the European Commission has the power to make 1992 the beginning of Open Door Europe rather than Fortress Europe. But they recognize that the commission faces intense pressure to set up a thicket of protectionist rules to accompany its internal deregulation.

"At the top of the commission, everyone hews to the free trade line," said Ambassador Kingon. "But when you go below the top level of the commission, when you go out to the various member states and talk to business groups and leaders, you hear quite a different tune."

That different tune can be heard loud and clear at the Brussels-based Committee for the European Community Motor Vehicle Industry. The European Commission has insisted that France, Italy, Spain and Portugal scrap their quotas on Japanese car imports as part of an effort to remove conflicting domestic regulations.

But the industry group, led by Peugeot, Renault and Fiat, has proposed instead that the national restrictions be replaced with communitywide quotas, a plan that the commission has agreed to consider.

The 'Shock' Of Competition

"The opening of the restricted markets to Japanese competition would be quite a shock for those countries," said Hanns Glatz, secretary general of the motor vehicle industry group. "Therefore there is a need for a transitional solution."

In the industry's view, that means imposing communitywide quotas that would limit Japanese imports to a little less than 1 million of the 10.5 million cars sold each year in Europe, about 100,000 fewer cars than the Japanese are now selling there.

Those quotas are supposed to last two or three years. Japanese officials worry, however, that they would continue indefinitely. The worries increase when they hear some industry executives, led by Jacques Calvet, Peugeot's chairman, say quotas should remain until the Japanese do more to "balance" the situation by greatly increasing their purchases of European cars.

European companies sold 80,000 cars in Japan this year — about 2 percent of the market — with German car makers, led by BMW and Daimler Benz, accounting for 80 percent of the European sales. Not surprisingly, German car makers worry far more than French and Italian ones that European-wide quotas could spur retaliation. What is more, some European countries that do not manufacture cars, like Ireland and Greece, are happy to have unlimited Japanese access to help hold down car prices.

Who Sells to Europe

Imports to the European Community totaled just under $400 billion in 1987, excluding trade among the 12 E.C. members. The following countries provide the most goods and services to E.C. nations. In billions of U.S. dollars.

United States	$66.4
Japan	41.9
Soviet Union	15.0
Brazil	8.3
Canada	8.0
Taiwan	7.9
Hong Kong	7.4
South Korea	7.1
Saudi Arabia	6.6
Algeria	6.1
Yugoslavia	6.1
China	5.9
Libya	5.8
South Africa	5.6
Australia	4.8

Source: Organization for Economic Cooperation and Development

The New York Times/Oct. 23, 1988

"One of the biggest headaches for us is automobiles," said Yoji Sugiyama, Japan's Minister to the European Community. "It seems unsolvable to me. The French position is so nasty, not only for Japan, but for the Germans, who worry about retaliation."

While Japanese executives fret about cars, American executives are concerned about telecommunications and financial services.

American telecommunications companies say that Europe's efforts to liberalize its government procurement programs have not gone far enough. In the past, contracts often went to domestic companies on a no-bid basis, so that it would be hard for an Italian company, not to mention an American one, to win a contract with West Germany's state-owned telephone company.

As part of the 1992 program, the European Community will require more competitive bidding. But as the government procurement rules are fleshed out, American and Japanese companies still believe they will be disadvantaged.

"It seems that the allocation process in Europe usually coincides with how much employment you have in a country," said Robert E. Dalziel, president of A.T.& T. Europe. To help obtain a foothold in European markets, A.T.& T. has built a semiconductor factory in Spain and bought part of a research laboratory in England.

Still, many Americans, protesting a lack of reciprocity, do not like the lengths to which companies must go to win government contracts. "You don't have to build a factory in Wyoming to sell telephone equipment in Wyoming," Mr. Dalziel said.

On the financial services front, American banks, brokerage firms and insurance companies all worry about the European Community's use of the word reciprocity.

The European Commission is considering a system under which a single license would allow banks to operate throughout the community. But a foreign bank could obtain a

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license only if its home nation offers reciprocity. American banks might be denied licenses since banks in Europe are permitted to do both commercial banking and investment banking while the Glass-Steagall Act bars most banks in the United States from investment banking. American authorities say that European banks already receive the same treatment as American banks in the United States and that it is wrong for the Europeans to ask for more than that.

"We find this reciprocity concept particularly troubling," Thomas J. Berger, a Treasury Department official for international monetary affairs, said in a recent speech.

But Mr. de Clercq, the community's trade minister, said it was only natural to ask for reciprocity. If Europe is going to dangle in front of foreign financial institutions the plum of opening branches with ease throughout its huge market, he said, should not Europe ask for something in exchange?

As an example, he said that Japanese banks now hold about 10 percent of the deposits made by European Community residents and corporations, while European banks hold only 35-hundredths of 1 percent of the deposits made by the Japanese. "Isn't it equitable that before we give Japanese banks access to 100 percent of the European market, we seek to increase that 0.35 percent?" Mr. de Clercq said.

There have even been fears that American banks and brokers already established in Europe might have their licenses revoked if the community found a lack of reciprocity. Last Wednesday, however, commission officials said subsidiaries of foreign companies established in Europe would not be deprived "of the rights they have acquired." Although that appeared to eliminate the risk of revocation, some American executives questioned whether they would now have the same right to expand as the European institutions.

In an interview, Mr. de Clercq added that Americans should not worry because the talk about reciprocity is generally directed at Japan and not the United States. But American officials and executives are hardly reassured by such statements.

"The commission has made no secret of its intention to use the bargaining power of Europe's new internal market to make sure that countries outside the E.C. give Europeans as good as they get, and it is safe to assume that it will not be shy in applying the reciprocity provisions," said John G. Heimann, chairman of the executive committee of Merrill Lynch Europe. "Reciprocity is a missile aimed at Tokyo that will land in New York and explode on Capitol Hill."

'Morally Incorrect' Stand on Banks

Mr. Heimann said that if Europe adopted a tough attitude on reciprocity, Washington "will not sit on its hands." He added that it would be "morally incorrect" for Europe to demand reciprocity from the United States, citing the experience of the Marshall Plan after World War II. The United States opened its doors then to European banks, giving them the same rights as American banks even though many European countries maintained barriers against foreign institutions.

But that argument does not sway some Europeans. "Suppose that Europe had the equivalent of Glass-Steagall and suppose you couldn't open up a bank in more than one European country, and suppose America was thinking of granting unlimited access to foreign banks," said Sir Roy Denman, the European Community's Ambassador in Washington. "Then the Americans would start talking about the need for a level playing field."

The European Community has more leeway to demand reciprocity, indeed to be protectionist, in financial services because it is an area not covered — at least for now — by the General Agreement on Tariffs and Trade, the treaty that sets rules for international trade. As part of the ongoing Uruguay Round of negotiations to refine and perhaps liberalize trading rules, industrialized and developing nations have agreed to develop rules for trade in services as well as several other areas.

In the negotiations, Washington and the community are at loggerheads over farm subsidies, with American officials saying the community is dragging its feet over the Reagan Administration's proposal to abolish all farm subsidies in a decade. Washington says such subsidies distort trade, discourage imports and are in effect protectionist. But the Europeans, while backing a reduction in subsidies, refuse to agree to phase them out.

A Flashpoint In Food Trade

A matter that threatens more immediate retaliation is the battle over growth hormones in meat, which are commonly used in the United States. The European Community has banned imports of such meat, saying it is simply bowing to the desires of health-conscious consumers. Washington insists that the ban is protectionist and it is threatening to retaliate against $100 million in European ham, pet food, tomatoes and other products on Jan. 1.

Asserting that the hormones pose no health risk, Washington has asked to set up an international panel to determine whether the Europeans have a scientific basis for saying the hormones are unhealthful. If the panel were to find such a basis, then the Europeans would be allowed to keep out the meat. So far, however, the Europeans have refused to agree to such a panel. "We're certainly heading for a clash at the moment," said Mr. Yeutter.

For his part, Mr. de Clercq questions the sincerity of some of the concerns expressed lately about Fortress Europe. "I am wondering how much of the fear is real," he said, "and how much is the result of orchestration by someone who is trying to give a bad image to the European Community with the purpose of putting the community on the defensive."

Mr. Yeutter denied that Washington has whipped up sentiment to persuade Americans to protest Fortress Europe, perhaps with the aim of making the community more forthcoming in the Uruguay Round.

"We're not going to the American business community and generating their involvement in the 1992 debate," Mr. Yeutter said. "They're coming to us and saying, 'Why aren't you banging on the doors in Brussels to keep things open?' "

Some observers say the you-are-more-protectionist-than-I bickering between the United States and the European Community is really aimed at pressuring the other to open up its market more.

Indeed, Ambassador Denman said it is time that these old allies stop quarreling. "We are each other's best customers," said the community's ambassador to Washington. "We take about 25 percent of U.S. exports. We both have low tariffs and few restrictions on each other's trade. We both want a more open world-trading system. What unites us is greater than what divides us." ■

New York Times, October 20, 1988, pp. D1,D7

Europe Offers Assurance Of 'Free and Open' Trade

By PAUL L. MONTGOMERY

Special to The New York Times

BRUSSELS Oct. 19 — As it prepares to create one market among its own member nations by 1992, the European Commission today declared that it had a "fundamental stake in the existence of free and open international trade" and dismissed fears of looming European protectionism as "senseless and groundless."

In its first comprehensive statement on the matter, the commission, which is the executive body of the 12-nation European Community, said it expected reciprocal trading opportunities from its partners, particularly the United States and Japan. The commission also said it would bring a flexible attitude to case-by-case consideration of external trade problems between now and the end of 1992.

The declaration came on a day when the commission forecast a 3.5 percent growth rate for its 12 members for 1988 and an increase of 7 percent in industrial investment — the largest percentage increase in 20 years. It cited the preparation of private companies for the post-1992 expanded market as part of the reason for the increased forecast.

The 12 members are France, West Germany, Italy, Belgium, the Netherlands, Luxembourg, Denmark, Ireland, Britain, Greece, Spain and Portugal.

'Fortress Europe' Feared

The commission's declaration on trade reciprocity, which will serve as a guide in case-by-case negotiations from now to the dropping of the remaining trade barriers among the member states in 1992, comes after repeated expressions of concern by American officials this summer.

These officials, like other trading partners of the community, fear that the post-1992 market will create a "Fortress Europe," coddling members while repelling outsiders seeking entry to the rich market of 320 million people. Some even fear that any restrictions might be made retroactive, affecting foreign companies already established within the community.

The commission, represented today by Lord Francis Cockfield of Britain and Willy de Clercq of Belgium, tried to put concerns to rest. "There can be no question of depriving the subsidiaries of foreign firms already established in community member states of the rights they have acquired," their statement said.

In general, the commission stressed the positive aspects of the expanded market, saying Europe sought to be a partner rather than a opponent. Since exports represent 10 percent of Europe's gross national product compared with 5 percent for the United States', for example, Europe would be foolish to turn protectionist, the commission said.

The removal of customs barriers among community members at the end of 1992 will mean vastly decreased customs and other formalities for imports. "Any product which is introduced on the community territory, as long as it satisfies the legislation of the importing country, and is admitted on its markets, will be entitled, as a matter of principle, to the benefit of free circulation throughout the community," the declaration said.

But the commission made it clear that Europe expected equal treatment elsewhere. "The commission reserves the right to make access to the benefits of 1992 for nonmember countries' firms conditional upon a guarantee of similar opportunities — or at least nondiscriminatory opportunities — in those firms' own countries," the declaration said.

Grounds for Optimism

Lord Cockfield said Europe expected the post-1992 market to serve as a spur to world economic growth, much as growth in the third world helped the economic expansion in the 1960's and 1970's before the oil shock and overwhelming debt.

The commission's economic forecast today, which must be reviewed by the European Parliament and debated by the member states, offered grounds for optimism. The last forecast of growth in 1988 gave an estimate of 2.75 percent, compared with today's 3.5 percent.

But the commission also noted problem areas: the unemployment rate was expected to stay at about 11 percent, ranging from 20 percent in Spain to 6.5 percent in Portugal; inflationary pressures, while under control in most countries, remained a threat; budget deficits in Greece, Ireland, Italy and Belgium were "excessive," and the widening differences in trade balances among member countries was causing disequilibrium.

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Journal of Commerce, October 19, 1988, p.1

US Will Police European Plans For a Common Market by 1992

By ROSALIND RACHID
Journal of Commerce Staff

NEW YORK — The United States will police European Community plans to create a common internal market by 1992 to ensure that it does not create new barriers to U.S. and other foreign companies, U.S. Commerce Secretary C. William Verity said Tuesday.

Mr. Verity called for creating bilateral technical and regulatory advisory groups of U.S. and EC business leaders and government officials. The panels would seek to make sure that the EC plan remains "an open and outward looking concept."

"The architects of the single market are increasingly under siege. Backsliding, narrow national interests and protectionism may grow as 1992 approaches," Mr. Verity told the Business Roundtable and the U.S. Council of International Business.

"Special interests are seeking to deny the benefits of liberalization to non-European firms," he warned. "And there are indications that other special interests are beginning to seek delays in implementing liberalizing aspects of the 1992 program."

In the toughest language emanating from a half-day forum here on what the single European market means for U.S. business, Mr. Verity lashed out at attempts to introduce a concept of reciprocity into new EC rules.

Under this concept, which is part of a recent directive on banking, a non-EC company would be granted only the same amount of access to the EC market that an EC company enjoys in the home market of that company. Such a proposal, Mr. Verity said, is a slap in the face to the principle of reciprocal trade liberalization on which the General Agreement on Tariffs and Trade is founded.

"Sectoral reciprocity is a dangerous concept. As proposed by some Europeans, it could divide the trading system and reduce economic growth. It would result in the denial of "national treatment," which has governed international investment. The United States should not accept this. The administration will not accept it," he said.

(The national treatment principle says foreign companies face the same laws and regulations as are imposed on domestically based competitors.)

Equally worrisome to Washington, the commerce secretary continued, are "transitional measures" to protect certain European industries (textiles and automobiles, for instance) as they adjust to competition in the liberalized environment, and the possibility that the community will develop technical and regulatory rules that are incompatible with a global market.

"The United States will resist any violation of our rights under the GATT or our bilateral treaties with European countries. The United States is going to be a policeman," Mr. Verity said.

It is in the context of the policeman's role that Mr. Verity called for bilateral advisory groups that would recommend "a compatible U.S. and EC business environment" for maximum business opportunities.

In less strident tones, business executives addressing the Business Roundtable-U.S. Business Council forum acknowledged that statements circulating in Europe are indeed cause for concern.

"We've heard that reciprocity could even be made retroactive," said Lisa Skoog de Lamas, manager for American Express Co.'s international corporate affairs.

But while these concerns exist, U.S. companies have the responsibility to work with the European Community to ensure that the single market enhances rather than inhibits trade, the panelists said.

Said Charles N. Goldman, vice president and associate general counsel for ITT Corp.: "U.S. business should talk more to EC business. The U.S. government's role in Brussels (Belgium) is limited now. But EC commissioners are receptive to (the business sector), which provides expertise the commissioners do not have."

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As Europe Unites Outsiders Line Up to Join the Club

A Community of 18 Is Not Inconceivable

New York Times, September 4, 1988, sec.4, p.4

By STEVEN GREENHOUSE

PARIS

AS the European Community pushes to form a barrier-free market by the end of 1992, other countries are crowding to join the 12-nation organization lest they miss out on the economic benefits.

The Europe of the 12, as the community is often called, might become a Europe of the 14 by 1995, and some see a Europe of the 18 by early next century. If that happens, the community will become a giant of 400 million people and an even more formidable entity for the United States and the Soviet Union to contend with.

For the next few years the community nations will be too preoccupied with the transition to a single market to undertake the arduous process of admitting new members. But when the community is ready to proceed it is expected to have a number of applications on the table.

Turkey applied to join the community last year. Austria will apply next year, many Vienna officials say, and Norway is expected to seek membership in the early 1990's. Some European Community officials even predict that Sweden, Switzerland and Finland, despite their neutrality, might seek to join, subtly aligning themselves more closely with the West.

In Austria and Norway, among other nations, business executives are leading the campaign for membership. "A lot of people want to be part of the integration of Europe, to be part of a united European economic space," said Sverre Linvedt, director of the Norwegian Export Council. Many executives fear that sweeping away the internal barriers will make it harder for companies from the outside to sell goods to the community. Although American and Japanese executives also worry about a protectionist Europe, such a monolith could especially hurt countries such as Switzerland and Austria, which send two-thirds of their exports to the community.

Many European officials predict that Austria will be the next to join. Austria's conservative People's Party supports membership while the Socialist Party has asked for a study of the issue. With polls showing that most Austrians favor joining, the Government says it will soon decide whether to apply. But many Austrians are hesitant. "Neutrality is a pillar of our foreign policy," an Austrian official said. "We don't think we should give that up to join."

Advocates of membership say Austria can join without becoming aligned with the Western alliance. They point to Ireland as an example of a community member that remains neutral. Opponents argue that it would be better if they could manage to maintain close economic links with the 12 member countries, while remaining separate. Brussels officials look favorably on Austria's applying, but a few say that because the community often takes pro-Western positions, it might be unrealistic for the country to join while expecting to remain neutral.

Neutrality is not an issue with Norway, which is already a member of NATO. In the early 1970's, Brussels approved Norway's application, but it never joined because 53 percent of Norwegians later voted against membership in a referendum. Now the idea of joining is growing more popular, but Oslo refuses to tip its hand. "The major political parties are in favor of joining, but they would like to postpone a decision until after elections in 1989 because it remains a delicate issue," a Norwegian official said.

Scandinavian Neutrality

Sweden is more hesitant about joining because of its longstanding neutrality. But even the Swedes might want in if their powerful private sector becomes convinced that it is missing the benefits. Because of its border with the Soviet Union, Finland is perhaps more concerned about maintaining neutrality. If Norway and Sweden join, however, European officials say there is a good chance that Finland will too. Iceland, a NATO member, may also follow the lead of Norway and Sweden. The officials predict that Cyprus and Malta might also join someday.

Even though Switzerland is surrounded by community nations, it is in no rush to join. Swiss corporate giants like Nestlé and Ciba-Geigy are already well entrenched in West Germany, France, Britain and other community nations. Treasuring their neutral role, the Swiss recently voted against joining the United Nations, and any referendum on European Community membership is expected to meet the same fate. Still, some Swiss officials say there could be a change of heart if the Swiss feel handicapped as outsiders.

While all these Western European nations are nudging closer to the community, Eastern Europe has also warmed toward Brussels. Last month, the community and Comecon, the Eastern bloc's trading association, granted each other recognition. Hungary, Poland and Czechoslovakia have also granted diplomatic recognition to the community, and in July Brussels signed a trade pact with Hungary, in part to reward it for its economic changes. Several other Communist nations are seeking similar agreements.

Perhaps the stickiest candidacy would be that of Turkey, which is larger geographically than any of the 12 member nations and whose population is comparable to Britain's. Some Brussels officials say they fear that if Turkey is admitted, its low wages might give its industries an edge over Western Europe's, while millions of the country's unemployed flooded freely across the continent. Some officials also contend that Turkey is not Westernized enough. Another obstacle is Greece's antagonism toward Turkey. In the view of some diplomats, the chief reason Turkey has sought to reconcile itself with Greece, which joined the community in 1981, is to improve its chances of membership.

"There is a fear that this is too large a bit to swallow," said Heinz Kramer, an expert on Turkey with the German Research Institute for International Affairs outside Munich. "They will probably try to avoid a clear-cut answer as long as they can. They recognize Turkey is a very strategic ally, so it is almost impossible to reject them bluntly."

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Wall Street Journal,
August 1, 1988, p.1

The Outlook

Europe Could Become The New Trade Villain

WASHINGTON

Forget about smashing Japanese radios with sledgehammers on the lawn of the U.S. Capitol. Forget about castigating South Korea for locking out U.S. beef, while welcoming U.S. military protection. A new trade villain is about to take over in Washington: Europe.

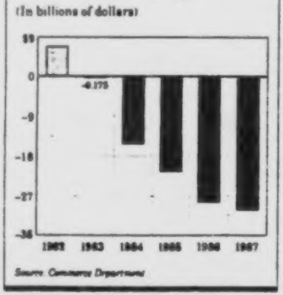
U.S. officials worry about signs that the European Community is erecting barriers against American goods and services as it moves toward economic unity in 1992. They also fear that the internal political demands of unification will force the EC to oppose the U.S. on some key issues in the current round of world trade talks—especially agriculture, services, and subsidies.

"The implications of 1992 for the United States are more serious than people realize," U.S. Trade Representative Clayton Yeutter said after a swing through the Continent. "The idea is sound and laudable, but it could lead to a lot of trade disputes."

Indeed, Mr. Yeutter says, "in the next few years, Europe will be a tougher nut to crack for us than Japan," traditionally America's most intractable trade rival.

U.S. Trade Balance With Western Europe

(In billions of dollars)



Source: Commerce Department

On the surface, such concerns appear badly misplaced. The U.S. lost its trade dominance over the community in 1983, as its overall trade deficit began to soar. But the red ink across the Atlantic was never as large as it was across the Pacific, and the U.S. deficit with the EC through May of this year shrunk to about $4.6 billion from $8.1 billion in the same period last year.

On the surface, such concerns appear badly misplaced. The U.S. lost its trade dominance over the community in 1983, as its overall trade deficit began to soar. But the red ink across the Atlantic was never as large as it was across the Pacific, and the U.S. deficit with the EC through May of this year shrunk to about $4.6 billion from $8.1 billion in the same period last year.

What's more, the U.S. has formally hailed the EC decision to create a unified internal market in 1992. The Reagan Administration has compared it with the pending Canada-U.S. Free Trade Agreement and officially accepted European pledges that internal unification won't lead to a "fortress Europe," locking out American and other foreign companies.

The EC's top trade official, Commissioner Willy De Clercq, insisted at the recent Toronto economic summit that "there will be no fortress Europe." And the community's Ambassador to the U.S., Sir Roy Denman, calls such worries "unjustified hoo-ha." He adds, "For the community to go protectionist in 1992 would mean shooting itself in the foot" because of the risk of "retaliation from other countries."

But what worries Mr. Yeutter and other U.S. officials is real or threatened European intransigence in areas where world trade rules are currently weak and vague. Chief among these are agriculture, services and subsidies. The U.S. is trying to create new international rules to prevent protectionism in these areas, but these efforts could touch sensitive economic and political nerves within the EC.

The top trade negotiator contends the community's Brussels bureaucracy is already drafting rules for 1992 that could deny U.S. financial institutions, automakers and other industries equal market access in Europe—even if they are already doing business there. What's more, he asserts, by adopting such 1992 regulations now, the community may be locking itself into positions in the Uruguay Round of world trade talks which would place it at odds with the U.S. drive to liberalize trade in services.

Even Ambassador Denman admits that, while the community isn't going protectionist, "a different question arises when one looks at items not yet covered by the international trading rules, such as services." European liberalism on those matters, he hints, may depend on U.S. concessions.

The Reagan Administration is already locked in a bitter struggle with the community over world farm trade. The U.S. wants trade negotiators who are due to meet in Montreal in December to conclude a framework agreement aiming at the complete elimination of farm subsidies. But Mr. De Clercq insists publicly and privately that agriculture subsidies—an important internal matter in Europe—can never be eliminated, but only reduced. He wants to focus on short-term rollbacks in subsidies, deferring the U.S. goal of killing them.

And the two sides are slugging it out over another pan-European matter, the four-nation Airbus airliner consortium, which the administration views as an unfair competitor to Boeing and McDonnell Douglas because it is heavily subsidized.

Mr. Yeutter says that even after meeting with EC officials last month, "I just don't know" how many more conflicts may break out before 1992. "They told me they can't be negotiating internally on the new rules and negotiate with us at the same time," he says. "They are saying, 'Trust us.' "

But the situation, he adds, "makes everybody insecure, and insecurity has a cost in economic activity. There's just going to be a lot of insecurity for everybody until 1992."

—Walter S. Mossberg

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THE WALL STREET JOURNAL TUESDAY, JULY 12, 1988, p32

Strategies for Survival in Europe in 1993

By PETER F. DRUCKER

For European businessmen the question is no longer: Will there be a true European Common Market? It is: What do we do today to prosper in the Europe of 1993?

The Common Market governments have pledged themselves to abolish the barriers to the intra-European flow of people, money, goods and services by the end of 1992. If they live up to these commitments, Europe will have fewer internal barriers than there are in the U.S., considering all our state and city regulations.

But do the European governments really mean it? Is it pure coincidence, for instance, that the French discovered drug smuggling from Spain just when France had to open its markets to Spanish fruits and vegetables? No drugs have been found so far, but Spanish produce trucks must wait for hours at the border, while the vegetables wilt. West Germany has introduced a bill that would make it expensive for middle-size, family-owned businesses to sell out or merge across frontiers. And, though London's bankers and brokers would clearly benefit, Prime Minister Margaret Thatcher staunchly resists the trend toward a common European currency or European central bank.

Businesses Are Off and Running

Yet what governments do or not do may no longer matter much. Businesses of all sizes have the bit between their teeth and are off and running. "We all know," says the chief executive officer of a middle-size specialty-chemicals firm, "that we have to act today as if 1993 were already here."

Unilever, the foods, soap and detergent multinational, called its European managers to Hamburg recently to put into effect a new organization and new strategies for a truly unified Europe. Another multinational, Philips, has reorganized its consumer-electronics business on the assumption that 1993 is already here. It replaced its 60-year-old structure of autonomous national companies—a Dutch Philips, a German Philips, etc.—with Europe-wide product-based businesses, a television-receiver company, for example.

Recently, five medium-size, family owned food brokers—German, French, Spanish, Italian and Danish—formed a "community of interest." Each family holds 51% its domestic company and 9.8% of each of the others. The five will act as one company in representing manufacturers and serving supermarket chains across national boundaries. "Knowing politicians, I expect all the present governmental barriers still to be here four years hence," says the Italian most responsible for the deal. "But they will have become nuisances and additional costs rather than the dominant market reality they have always been, and this is the only possible basis I can see for picking a business strategy in Europe today."

But it is also a shaky basis. It means committing one's business to highly risky assumptions.

Drucker on Management

The most important decision a company has to make is whether the Common Market will be a market of competing national economies or of competing European businesses.

What, for instance, should a financial business assume regarding the future of Europe's stock markets? London is, of course, by far Europe's leading exchange. But its position is quite different from that of the New York Stock Exchange in the U.S. For the majority of European businesses, their own local exchange is the only one that matters—the only one that trades the shares of national companies and on which they can float their equity.

This national monopoly of the local exchange is highly profitable for the domestic banks. Small wonder then that the Continentals are committed to its perpetuation. But can it survive? Institutions, especially the pension funds, are rapidly becoming the dominant investors in Europe as they were in the U.S. 10 or 15 years ago. The local markets do not have the liquidity they need. And they are chafing under the high costs of the present monopolistic system. Perhaps the local exchanges will survive as the places where prices are officially registered, with the actual trading done off-market by transnational brokerage forms, especially for institutional customers.

Something like this is clearly what, judging by their recent actions, the Japanese, e.g. Nomura, are positioning themselves for. The large American and probably the major Swiss firms are acting on an even more radical assumption: The existing stock exchanges in Europe will become irrelevant, especially for large institutional investors, and will be replaced, in effect, by a trans-European over-the-counter discount market.

The future structure of commercial banking in Europe is another major area of uncertainty. Traditionally, competition among European banks was confined to one's own country. But a few years ago the three big Swiss banks shocked everyone by moving into Frankfurt in an open bid for domestic German business. Deutsche Bank, Europe's biggest, then moved aggressively into the domestic banking business in Italy. Is this going to be the trend of the future? Europe, after all—unlike the U.S.—has a long tradition of multibranch, nationwide banks with multiple headquarters. Or is the future prefigured by the recent Spanish development in which the country's four largest banks merged into two even larger but purely domestic banks? And what future role is there for that peculiarly European institution: the bank that is a giant in its own small country where it controls the bulk of industry, but which is at best "supporting cast" on the world financial scene? Can banks like this survive in a unified common market? Will they have to ally themselves with a major-country bank, or perhaps even with a major U.S. or Japanese bank? Or will they themselves join in a transnational European "middle-class" banking league?

Even more critical—and perhaps a good deal more risky—are the decisions facing middle-size, privately held firms. Quantitatively, such firms are neither more numerous nor more important in Europe than they are in the U.S. But sociologically, psychologically and politically they loom much larger almost everywhere. Few of them, most observers agree, are likely to survive unchanged the shift to a truly integrated Common Market.

But which of three possible strategies should a given firm choose? The specialty-chemicals maker mentioned earlier is moving aggressively into Europe, marketing its products all over Europe, and even producing in several countries. But for this to be the right course, a firm needs distinctive products or distinctive technology and considerable marketing expertise. It also needs access to finance—and, in contrast to the U.S., that's limited for middle-size European companies. Above all it needs managerial resources that the European family-owned firm still finds hard to attract and hold.

Another strategy is the one chosen by the five food brokers mentioned above: to

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(continued)

create a European company by transnational merger or affiliation. But a large number of European privately held companies seem to opt for what is least likely to work: merger or affiliation of their own non-European, national firm with other non-European, national firms in their own country, thus creating national miniconglomerates. Others are giving up and trying to sell their businesses to large publicly held companies in their own countries.

What makes decisions doubly difficult and highly emotional is that they get entangled in the "generation gap" in the European privately held firms. The people who built the businesses after World War II are reaching retirement and their whole experience has been within one domestic economy. The generation about to take over has, however, grown up as "European." Where the older people see European economic integration as a threat, the younger ones see it as an opportunity.

Altogether the most important decision a European company has to make—but also an American multinational operating in Europe—is whether the Common Market will be primarily a market of competing national economies or of competing European businesses.

To explain: Deutsche Bank sees the European financial market as a common market for competing individual banks. Indeed, Deutsche Bank has announced that it intends to become a factor in all major European countries. But industrial companies with which Deutsche Bank itself is most closely affiliated have made it equally clear that they foresee a different Europe in which very large but purely national enterprises compete against one another.

'Europe of Fatherlands'

French official policy similarly pushes French business toward what General de Gaulle once called a "Europe of Fatherlands," that is, toward strictly French supercompanies. For the existing "European companies"—the subsidiaries of the American multinationals first and foremost, but also the large European companies headquartered in small countries, such as Philips and Unilever in Holland, the Swiss pharmaceutical giants, Sweden's Ericsson and Electrolux—a unified European economy transcending national boundaries is the only thing that makes any sense at all, the only thing that can possibly work. And this is also how the newcomers, the Japanese and the Koreans, see it. But while economically rational, it may not work politically—or only against tremendous opposition.

Almost certainly, the Europe of tomorrow will be both an economy of competing national economies and an economy of competing European businesses—in that respect it will look quite different from the "common market" of the U.S. But which industry and which market will go which way? Of the two leading telecommunications manufacturers of Europe, one, the German company Siemens, expects European telephone markets to remain national; the other, Ericsson in Sweden, is equally convinced that such major buyers as the Budespot in Germany and PTT in France will tomorrow buy "European." Can both be right? And will a large national retailer—Marks & Spencer in the U.K., for instance—buy "European" tomorrow or will it continue to buy "British"?

In a meeting of senior European executives I attended in London recently, the participants split 50-50 on this question. But they all agreed that any European business—and not only the big one—will have to make up its mind within a year or two to which of these two assumptions it entrusts its future.

Mr. Drucker is Clarke professor of social sciences at the Claremont Graduate School.

Industry Week, July 4, 1988, pp.16,17

COMPETITION

Europe's 1992 challenge

How will U. S. industry cope with "unification"?

Kerry Gavin

By JOHN S. McCLENAHEN/ For 31 years, since the Treaty of Rome created the European Community (EC) in 1957, the founding dream of an economically unified and powerful Europe has remained largely unrealized.

But, in fewer than five years, European industry could be mounting a startling new competitive challenge to U. S. companies that manufacture on this—and the other—side of the Atlantic. At its heart will be a concentration of industrial power that's already underway.

'WHITTLED DOWN.' As the 12-country EC heads for the scheduled elimination of most national trade barriers by the end of 1992, the number of European companies is being "whittled down" through merger and acquisition, points out Walter Joelson, chief economist at General Electric, Fairfield, Conn.

"You are going to get a tremendous concentration of industrial companies that will, in effect, be geared to this unified [European] market," he predicts.

A probable result, in both capital goods and consumer products, is that "leaner and meaner" European manufacturers tapping a single "home" market one-third larger than the U. S. market will achieve new production economies. These economies of scale should increase their competitiveness.

What's more, many European-based producers will continue to have greater psychological and physical closeness to their customers than do some U. S.-headquartered competitors. This closeness is a demonstrated competitive advantage.

And there is a possibility that an EC largely free of internal trade barriers could develop a business-damping "Fortress Europe" mentality toward outsiders.

"There is a concern that if the EC feels that a foreign government—or a foreign industry segment—does have barriers [to EC companies] in place, that the EC is not going to be sympathetic and open its markets to that country or that industry," reports William Cornelius, director of trade policy, Dow Chemical U. S. A., Midland, Mich.

ILLOGICAL EXTREME. However, the scenario of overwhelming European success can be carried to an illogical extreme. American companies are not predestined to be clobbered by their European competitors after 1992.

Indeed, such U. S. companies as GE, Dow, 3M, and Hewlett-Packard (HP) already have well-established European presences. And the same free flow of goods, services, capital, and people that European firms are supposed to benefit from will redound also to American companies operating in the EC.

For instance, product-shipping costs and delays for U. S. firms should decrease as EC customs barriers are scrapped. Today, when HP brings products into Europe (and imports constitute about half of its European sales) it pays customs duties just once. Yet, every time a product crosses a country border, customs declarations must be filled out and filed again.

In contrast, "what is planned to disappear is all of the administrative work on that secondary movement of the product," explains Dennis Raney, HP's

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Geneva, Switzerland-based director of finance and administration for Europe. After 1992, HP will be able to import "a product into Germany, pay the customs duties, make all the administrative paperwork there, and then move it to Spain with no other administrative actions," Mr. Raney says.

HP's costs will fall as the number of physical-handling and paperwork requirements—and the people needed to carry them out—are reduced, he states, without specifically quantifying the savings.

For Dow, which does about $3 billion in business annually in the EC, the prospective demise of most trade barriers will cut costs $50 million, calculates Mr. Cornelius.

POSITIVE PEOPLE IMPACT. At 3M, which has been "pan-Europeanizing" its EC manufacturing for about 20 years, European unification could have a positive impact on people as well as products.

"The changes will provide 3M people in Europe with new opportunities for individual development and expanded motivation," believes Harry A. Hammerly, the company's vice president for Europe.

"As resources are shared between countries, a person will be able to take on broader responsibility and advance without leaving his or her home country. A single individual may be able to assume Europe-wide duties for a product line or a function, without moving."

ALL DELIBERATE SPEED? Europe has embarked on an ambitious agenda. By the time 1992 rolls around, the EC may have promulgated nearly 300 directives aimed at eliminating trade barriers and encouraging economic unity.

However, it's one thing to junk customs procedures with all deliberate speed and quite another thing to alter longstanding practices in West Germany, France, or Britain of buying nationally produced capital goods.

The point is that some of the slated changes are going to take quite a bit of time to implement.

"What they [the Europeans] have constructed is a blueprint for what will probably not totally take place until the 21st century," suggests Dow's Mr. Cornelius. "Some parts of it will be in place in 1992. But—because of the complexity of the situation and the taxes and the other portions of it—on Jan. 1, 1992, all is not going to be in place. It will be a slow transition."

Nevertheless, Mr. Cornelius concludes, "we're confident that the intent is well-placed and that it [trade unification] will occur—[though] not in the time parameters that they are looking for." ■

New York Times, March 13, 1989, pp.A1,D6

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U.S. CORPORATIONS EXPAND IN EUROPE FOR '92 PROSPECTS

AGGRESSIVE POLICIES SET

Plans for Barrier-Free Market of 320 Million Consumers Stir Hopes for a Boom

By STEVEN GREENHOUSE

Special to The New York Times

PARIS, March 12 — The Whirlpool Corporation has entered into a $2 billion joint venture to push its way into the European appliance market. The International Paper Company has made a $350 million bid for a French paper maker. And Shearson Lehman Hutton Inc. has recently expanded its investment banking offices in Milan, Italy, and in Madrid.

Meanwhile, the Coca-Cola Company has started construction of one of the world's largest canning plants in Dunkirk, France, and has revamped its organizational chart to put more emphasis on the European Community.

With steps like these, a wide range of American companies, from giant multinationals to small computer makers, are moving aggressively to take advantage of the barrier-free market that the European Community plans to establish after 1992. American companies believe that 1992 will speed economic growth and lower the cost of doing business in a market of 320 million people.

'A No-Lose Situation'

"There's no doubt that the importance of what's happening in Europe has really hit home in the United States," said Eamonn Bates, who deals with European Community matters for the American Chamber of Commerce in Brussels.

Even as the 1992 plan gets bogged down in debates over whether to harmonize indirect taxes or adopt a single European currency, United States companies are making plans to expand, restructure and streamline their European operations.

"There is an understanding among American companies that preparing for 1992 is a no-lose situation," said Stanley Crossick, chairman of C & L Belmont, a Brussels-based consulting group formed by Coopers & Lybrand. "If 1992 happens, you're prepared. If it doesn't happen, then you're more competitive in any case."

More Attractive Market

The 1992 plan will make Europe a more attractive market in several ways. It will harmonize clashing product standards, for example, so that the same item can be sold in many countries without substantial modification. It will reduce shipping costs by eliminating customs posts, which slowed the movement of goods.

As they study 1992, many American companies that have paid scant attention to Europe have suddenly become eager to develop or expand their European presence. The General Electric Company, for example, has made several strong moves in the past two years: forming joint ventures in major appliances and electrical equipment with Britain's largest electronics concern, acquiring France's largest medical equipment maker and announcing plans to build a $1.7 billion plastics factory in Spain.

The prospect of 1992 has even

U.S. Companies Expand European Position for '92

Continued From Page 1

produced a cottage industry — dozens of American newsletters are proffering advice on 1992 to companies, while management consultants and accounting firms have opened special "Euro-offices" in Brussels to provide information and guidance on 1992.

"The fact is there will be a limited time to catch the opportunities 1992 offers, and you have to be ready for it," said Walter di Pretoro, senior vice president for European Community matters at Honeywell Inc.

A Bonus for I.B.M. and Ford

American companies that have been in Europe for decades see 1992 as a bonus. Giants like the International Business Machines Corporation and the Ford Motor Company are already pan-European and will benefit immediately from the harmonized product standards and the elimination of customs posts and their transportation delays.

"The best Europeans are frequently Americans," said Prof. George Taucher of the IMEDE business school in Lausanne, Switzerland.

Still, I.B.M. and Ford are not sitting idly by. I.B.M., which had more than $20 billion in revenues in Europe last year, is considering whether to put less emphasis on national sales forces and more on regional forces, while Ford is shuffling its manufacturing within Europe to reduce costs.

"If you're well established in Europe, then 1992 is an opportunity to rationalize production, to focus on some communitywide marketing program and to improve logistics," said John F. Magee, chairman of Arthur D. Little Inc., the management consulting concern.

Coke Gains From Restructuring

On Jan. 1, Coca-Cola restructured its worldwide management into four groups, one of them responsible for the European Community. And Coke has consolidated its bottling operations to enable it to cut costs and prices and has terminated some licensing agreements so that it can market its soft drinks itself. Thanks to measures like these, it increased its revenues by 11 percent in Europe last year.

"We see Europe as an area for important growth as we move into the 1990's," John W. Georgas, executive vice president in charge of Coke's international soft-drink business. Coca-Cola anticipates sales growth of 10 percent a year in Europe.

The Sara Lee Corporation, with $3.5 billion in sales in Europe, is following a different path — acquisitions — to enhance its European position. Last month, it bought a Dutch coffee and tea company for $250 million, and last year the Chicago-based company took control of Paris-based Dim, Europe's largest maker of pantyhose.

"Imagine that you're a big consumer products company selling upscale products, and you want to grow," said John H. Bryan Jr., Sara Lee's chairman. "There are two markets fairly easy to get into: Europe and the United States. Japan is a very tough market to deal with."

Following the lead of the Gillette Company and the Procter & Gamble Company, Sara Lee is also experimenting with "Euro-branding" — putting several languages on a single package and distributing that package to several countries.

"There are growth opportunities that you might not see in a lifetime, opportunities to take part in the consolidation of a very large market," Mr. Bryan said.

Expansion in Financial Services

In financial services, Citicorp, already the most prominent non-European bank in Europe, with 18,000 employees here, has acquired banks in Belgium, Italy and Spain. Last year, it introduced credit cards in West Germany, Belgium and Greece.

"We look at Europe as an economy slightly larger than the U.S. and double the size of Japan," said Paul J. Collins, the Citicorp vice chairman in charge of Europe. "We're not satisfied with the level of representation we have or with the level of profits."

With 300 branches in Germany and 100 in Spain, Citicorp aims to have at least 5 percent of Europe's households as customers by the early 1990's. Noting that Citicorp's size should give it economies of scale in its support facilities, Mr. Collins said he hopes to attract customers by providing services more cheaply than the competition. In addition, the vice chairman hopes to win new customers with financial services Citicorp has developed outside Europe, like quick answers on mortgage applications and a single bank statement that covers all of a client's accounts.

Boom for U.S. Investment Banks

American investment banks have enjoyed a boom as 1992 approaches. Scores of European companies have turned to giants like Morgan Stanley Group Inc., Salomon Brothers Inc., and Shearson Lehman Hutton to help them in the wave of mergers and acquisitions sweeping through Europe.

Spurred by growth in the merger and acquisition business, Shearson, for example, has increased the size of its European work force to 2,300, double the level in 1985. As Europe's stock markets deregulate, opening the doors to outside competitors, Shearson and many other American investment banks have expanded their offices in Paris, Frankfurt, Milan and Madrid.

"As far as the American investment banks are concerned, there is certainly no pulling back," said Jacques Gelardin, chairman of Shearson's European operation. "If anything, there will be a greater shift of resources toward Europe."

Recent Moves by Multinationals

Although Europe was known as a stomping ground for American multinationals in the 1950's, some large American companies, including G.E., Whirlpool and the American Telephone and Telegraph Company, have only recently made a significant push in Europe.

A.T.&T. has built a $220 million semiconductor plant in Spain. It has also agreed to form a joint venture with Italtel, the Italian telephone equipment company, to participate in a $25 billion program to upgrade Italy's telecommunications system.

"The idea is that you have to be in at least two of the world's three major markets — the U.S., Japan and Europe," said Professor Taucher. "If not, it will be increasingly difficult to survive."

Companies like I.B.M. and Ford would benefit automatically.

Whirlpool had for years acted as if the United States was the only market that counted, but prospects for 1992 helped change its mind. In January it completed a joint venture agreement with Philips N.V., the Dutch electronics giant, in which it paid $360 million for a 53 percent share of Philips's $2 billion major appliance business. In one swoop, Whirlpool became a giant in Europe — and it has the option to buy out the remaining 47 percent of the company from Philips.

"We like the idea of having a company like Philips as a partner because they know more about operating in Europe than we do," said Ralph Hake, Whirlpool's senior vice president for planning and development.

Even some small companies that might once have ignored Europe are eager to expand across the Atlantic. For example, Sun Microsystems Inc., a maker of computer work stations, based in Mountain Valley, Calif., recently opened a technical center in West Germany and is building a small factory in Scotland. "To be a major player in the marketplace, you have to be internationally recognized," said Darryl Barbé, head of Sun's European operations.

Burst of Activity in Brussels

Nowadays in Brussels, American management consultants, accounting firms and public affairs agencies are tripping over each other trying to sell American corporations the latest information and advice about 1992.

What is more, many American companies have hired lobbyists to press European Community officials on various issues, including proposals that would restrict the freedom of American financial institutions to do business in Europe.

In a sense, this craving for information on 1992 is good old American keeping-up-with-the-Joneses. "I think 1992 is a vehicle for change," said Harry A. Hammerly, vice president in charge of Europe for the Minnesota Mining and Manufacturing Company. "Whenever there is a change like this, it is those companies that are aware and taking action who have the best advantage."

New York Times, March 11, 1989, pp.1,36

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Europe, Facing Tough Decisions, Now Cautious on a Single Market

By JAMES M. MARKHAM

Special to The New York Times

PARIS, March 10 — After an initial period of high excitement about the creation of a single market of 320 million consumers by the end of 1992, Western European politicians and citizens have started to register skeptical and even frightened accents as hard decisions loom on pivotal issues.

In the coming months, the 12-nation European Community will confront such contentious questions as the creation of a European central bank, the leveling of rates of indirect taxation, the abolition of all frontier controls and the institutionalization of workers' rights to appease trade unionists worried that big business will be the big winner in the single market.

Jacques Delors, the French Socialist who heads the community's Brussels-based executive commission, maintains that this package of initiatives will help make the single market both acceptable to European citizens when it comes into being at the end of 1992 and capable of withstanding economic challenges from the United States and Japan.

Yet, increasingly, Mr. Delors lacks the enthusiastic, overt support he once enjoyed in Bonn and Paris for this grand design. In other capitals, politicians are realizing, too, that the sum of the details of the 1992 undertaking means the surrender of large chunks of sovereignty to Brussels.

"We are going to go through a very long tunnel before we come to the other side," predicted Meinhard Miegel, an economist at Bonn's nonpartisan Institute for Economy and Society, adding that he did not think the Jan 1. 1993, deadline would punctually be met. "The next few years are going to marked by ever more critical questions being asked," he said.

A variety of European politicians and community officials said there was no danger that the 1992 project would be completely derailed, but most concurred that a testing phase lay ahead.

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Several pointed out the irony that this difficult period was opening just as American executives and politicians have started to regard the single market as if it were already an economic and even strategic reality.

At the community's towering headquarters in Brussels, "the anti-1992 backlash" is a phrase that has been incorporated into workaday jargon about rapeseed oil quotas, lawn-mower noise standards and the mutual recognition of dental diplomas in the 12 member states.

"The initial enthusiasm of the self-confident is being seriously tempered by the nervousness of the unself-confident," commented a senior community official, speaking of West Germany in the first instance and France in the second. "The other angle of the backlash that is more disturbing is that people are beginning to see through the hype."

Claus Ehlermann, spokesman for Mr. Delors, acknowledged that Western European citizens had been on an emotional roller coaster on 1992, which initially was sold as almost a miraculous solution to the problems of slow growth and unemployment.

"Last year was clearly a year of enthusiasm after the long night of 'Euro-pessimism' and 'Euro-bashing,' " Mr. Ehlermann said. "We are today in a phase of greater soberness and realism in which people realize that the road is difficult, and that not everybody will gain."

'We are today in a phase of greater soberness and realism.'

The most striking turnaround has occurred in France, where last spring President François Mitterrand made the challenge of the single market the central theme of his re-election campaign. Mr. Mitterrand won the May election convincingly, but he kindled fears about 1992 that were exploited by the National Front on the far right and the Communists on the left.

Since then, Mr. Mitterrand has beaten a brisk retreat from his lyrical European rhetoric, while his Prime Minister, Michel Rocard, has warned that the community's proposal for lowering France's indirect taxes could mean the "pauperization" of the state, which is heavily dependent on them for its revenue.

In a television interview last month, Mr. Mitterrand railed against the "gangsterism of the strongest" in the world of international finance and, sounding a truculently nationalist note, declared:

"Me, I tell those who are listening, whether businessmen or workers, that they can count on me with the Government to establish a system that will prevent the pillaging and ruin of the French economy, above all in the heart of the Europe of 1993."

A Similar Shift in Germany

Presidential aides stress that Mr. Mitterrand has only tactically shifted to accommodate political reality. But a similar shift is perceptible in Chancellor Helmut Kohl of West Germany, a conservative politician who faces difficult parliamentary elections next year and the unwelcome appearance of a nationalist, far-right movement called the Republicans.

The surface cooling on a unified Europe in Paris and Bonn has in some ways magnified the impact of Prime Minister Margaret Thatcher's anti-Brussels blasts. In an important speech in Bruges last September, Mrs. Thatcher attacked Mr. Delors's highly tentative suggestions for a supranational authority in Brussels.

"We have not successfully rolled back the frontiers of the state in Britain," Mrs. Thatcher declared, "only to see them reimposed at a European level with a European super-state exercising a new dominance from Brussels."

On Jan. 25, Nigel Lawson, the British Chancellor of the Exchequer, fired another salvo in Mr. Delors's direction — this one evidently aimed at weakening a report that the commission's president is preparing for the community's June summit meeting on ways to create a European central bank and a common currency. The Delors report will be issued next month.

Support for Thatcher

Although Mrs. Thatcher is often caricatured in the Continental press as an incorrigible anti-European scold, on some issues she is saying in public what others believe but would prefer not to utter aloud.

On the central bank question, she has the silent support of the mighty West German Bundesbank, which believes that a European monetary authority would weaken its own hold on the European Monetary System and ultimately be inflationary. The interior ministers of France and West Germany share Mrs. Thatcher's concern that abolishing frontiers would compound illegal immigration and crime.

As Mr. Thatcher stands four-square against the looming community agenda — central bank, tax harmonization, the abolition of frontiers and the "social dimension" of workers' rights — Mr. Delors will need a renewal of a commitment by others to push them through. Spain now holds the community's six-month rotating presidency, and some are predicting a stormy summit meeting when the leaders of the 12 gather in Madrid in June.

Despite symptoms of a backlash against 1992, the step-by-step approval of undramatic individual measures has created "a sort of irresistible momentum," according to Peter Ludlow, head of the Center for European Policy Studies in Brussels.

"I think what's beginning to dawn," Mr. Ludlow said, "is that if you really go through with these things you are beginning to turn around political power in Europe. The name of this game is a very big transfer of sovereignty."

Government Executive, February 1989, pp. 21-22,24

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The Power Of The Eurocrats

As the European Community moves to dismantle internal trade barriers—possibly erecting new barriers to U.S. trade in the process—U.S. officials will deal increasingly with a strange breed of officialdom: the Eurocrats.

BY VIRGINIA CROWE

Trade between the United States and its largest export market, the European Community (EC), is suddenly headline news. The latest round of the multilateral trade negotiations in the General Agreement on Tariffs and Trade ended in stalemate in December, when EC negotiators could not agree to U.S. demands that all trade-distorting agricultural subsidies be eliminated.

On Jan. 1 the Community's 1988 ban on hormone-fed beef, suspended for a year for exporters of the product, finally affected U.S. producers, threatening to cost them $100 million in annual sales. The ban brought retaliatory, 100 percent duties on European products exported to the United States, such as hams and canned Italian tomatoes. And that $100 million levy risked escalating counter-retaliations.

Meanwhile the prospect of the elimination of all trade barriers between the 12 EC nations by 1992 is compelling close attention from American business and government alike. This step will create a unified market of 322 million consumers. Some fear that despite European assurances, when the internal barriers go down, external tariff barriers may go up, creating a "fortress Europe" to protect the EC market for European companies and products.

As a result, more attention is probably focused on Europe right now than at any time since then-Secretary of State Henry Kissinger proclaimed 1973 "the Year of Europe" in U.S. foreign policy. Government and industry working groups have been created to prepare to meet the challenge, and the Senate Finance Committee and the House Ways and Means Committee have requested a special study from the International Trade Commission on how 1992 will affect U.S. interests.

Yet the nature of the European Community, its decision making processes and its institutions are not widely understood, even in Europe itself, still less the nature of the bureaucrats who staff its institutions. U.S. trade officials are dealing with a relatively new species of bureaucrat, the genus Eurocrat, natural habitat Brussels. Eurocrats are the officials who help frame and administer

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Virginia Crowe is the author of Britons in Brussels, *a study of British recruitment to the institutions of the European Community.*

the policies of the European Community agreed upon by the leaders of the member countries, on the basis of proposals made to them by the Commission of the European Community.

Eurocrats serve a unique international organization, one that has real supranational authority to take measures with the force of law in its member countries. These have all surrendered to the EC a measure of national sovereignty in certain policy areas, mainly agriculture and trade. The Eurocrats are thus a cross between national and international civil servants; their role in building a European Community, in which the member states and their leaders may have differing expectations, is a sensitive and sometimes difficult one.

Origins of the Community

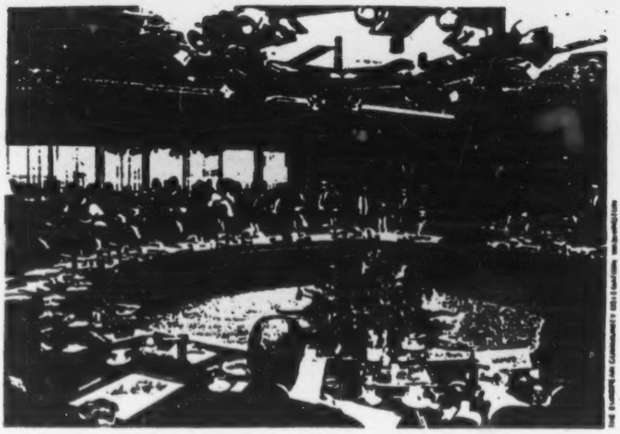
The treaties founding the Community were signed by Belgium, the Federal Republic of Germany, France, Italy, Luxembourg and the Netherlands more than 30 years ago. Britain, Ireland and Denmark joined in 1973, Greece in 1981, and Spain and Portugal in 1986. The founding treaties sought "to lay the foundations of an ever closer union among the peoples of Europe," with the creation of a common market between them as the first step.

In the economic recessions of the 1970s, however, progress toward eliminating the barriers to a true common market was slow, while Europe's trading competitors, especially the U.S. and Japan, forged ahead. A serious case of Eurosclerosis seemed to have set in.

The Single European Act of 1986 gave the enlarged Community a renewed impetus. It set the member states the challenge of legislating some 300 measures to achieve the free movement of people, services, goods and capital by 1992.

One of the driving forces behind the single market was Jacques Delors, now in his second term as president of the European Commission. Last summer, Delors revealed his vision of a Community where "in ten years' time 80 percent of the economic, and perhaps social and tax legislation will be of Community origin."

British Prime Minister Margaret Thatcher, while conceding that "on many great issues the countries of Europe should try to speak with one voice," roundly rejected this prediction of a Europe run from Brussels by the Eurocrats. She insisted that "working more closely together does not require power to be centralized in Brussels or decisions to be taken by an appointed bureaucracy." She added, in a September speech in Bruges, Belgium, "We have not successfully rolled back the frontiers of the State in Britain only to see them reimposed at a European level with a European superstate exercising a new dominance from Brussels."



The heads of state of European Community nations meet about three times a year in the European Council. Above, a June 1987 meeting.

Other EC leaders have taken issue with Thatcher's position, including West German Chancellor Helmut Kohl, who has called for a "pooling of sovereignty" and the creation of a "common social and currency area."

Constitutional Framework

Some of the governing institutions of the EC are superficially similar to those of the United States. The European Court of Justice, for example, interprets European Community law for the national courts, and its rulings are binding. There is also a democratically elected assembly of representatives, the European Parliament. But the functions of the EC institutions, their powers and the balance between them are very different from this country's.

Some areas, most notably defense, education, housing and health, remain the province of national governments, except insofar as they impinge on employment and social affairs. Foreign policy, while coordinated by foreign ministers of the member states, is not subject to Community authority either.

The framework for Community action is set by the heads of the EC governments, who meet about three times a year in the so-called European Council. This forum was not set up by the founding treaties and has no standing secretariat, but agreements made at its meetings are crucial to the direction the Community takes. It is at this level that differences in visions for the future of the Community must be reconciled.

The European Parliament, though it strives to enhance its role, remains largely advisory and has only been elective since 1979. It can debate issues, but its most important function is to give final approval to the European Community Budget, more than half of which is spent on the agricultural subsidies to which the United States objects so strongly.

The real law-making body of the European Community is not the Parliament, but the Council of Ministers. Ministers from the member states meet to negotiate about and eventually to adopt directives and regulations, which are the equivalent in the EC of Acts of Congress in the United States. The council is, in theory, a single body, but its composition changes with the subject under discussion. Agriculture Ministers from the member states deal with agriculture, Trade Ministers with trade, Finance Ministers with finance, and so on, with the lead body, the General Council, formed by the Community's Foreign Ministers.

Some 2,000 Eurocrats in the Council Secretariat in Brussels, including a number of legal linguists and translators, organize and administer the deliberations of the Council of Ministers. The Council meets in its various configurations many times a month and can only legislate on the basis of proposals from the European Commission.

The Commission

The majority of Eurocrats work in Brussels for the 17-member Commission of the EC. The governments of each member state nominate commissioners for an initial four-year term—two commissioners each from the five larger countries and one each from the seven smaller countries. They may be politicians, trade unionists or otherwise distinguished people, usually in public service in their own countries. But once appointed, they must act in the interest of the Community as a whole, independently of their national governments (who are sometimes alarmed by the extent to which their nominees carry this independence).

This year there are women commissioners for the first time, from France and Greece. The president is designated by agreement from among the commissioners; current president Delors is a former Finance Minister of France. The degree of leadership exercised by presidents depends on force of personality and intellect rather than on legal authority.

The responsibilities of the Commission and its staff are both political and administrative. They have a duty to promote the "European" ideal in the face of member states' tendency to revert to mere defense of national interest in negotiations. The Commission also serves as custodian of the "Community conscience," ensuring that EC decisions are implemented by the member states; it can, if necessary, take action in the European Court against companies or member states violating Community laws.

Officials must consult extensively in member states and with technical and interest groups to make acceptable proposals for legislation to the Council. Commission officials administer the common policies agreed by the Council, notably the agricultural policy, the regional and social policies, and—of key importance now—the single market policy. The Commission draws up the EC budget for approval by the Parliament and Council, and thereafter manages it.

Eurocrats in world capitals act as heads of diplomatic missions; in Washington, the Community is represented by Sir Roy Denman. In international negotiations—chiefly dealing with trade and agriculture—the Community is represented by commissioners with the appropriate portfolios or their senior officials.

Eurocrats

Despite popular impressions of a "bloated Brussels bureaucracy," Commission officials number only about 15,000, of whom about 1,500 are language specialists and 3,000 are employed in scientific research centers.

They are divided among more than 20 agencies and directorates general dealing with such subjects as external relations and agriculture. Directorates on internal market and industrial affairs, on economics and finance, and on taxation are heavily involved in preparing for 1992. The powers of the Community are such that the staffing of all the institutions, especially at senior levels, is a matter of understandable sensitivity among member states.

In the earliest days of the Community, it was thought that a completely independent supranational European Civil Service would be established. But the prospect of so totally independent a body encroaching on national prerogatives proved difficult for member states to accept. They needed the assurance that their vital interests would be safeguarded and that the officials making policy would be competent people who understood the particular circumstances of their countries and with whom their own nationals and officials could communicate easily. The Commission therefore evolved pragmatically—with the hallmarks of an independent, classic civil service, but with necessary political accommodations in staffing.

The inevitable interest of member state governments in appointments to the top levels of policy making was recognized as legitimate, and the concept of informal "geographical balance" in the nationalities of officials in all the policy-making grades was established. At the topmost level, and to a decreasing extent at the next two levels, governments have a substantial influence on appointments.

European Community President Jacques Delors, left, is serving his second term. Sir Roy Denman, right, represents the European Community in Washington.

To eliminate overwhelming influence by any one nationality, there is also a rudimentary system of checks and balances within departments or directorates. Commissioners are not normally of the same nationality as their topmost officials, and the top three grades within any directorate are generally distributed among nationalities.

Qualifications

Being the right nationality can be important for promotion into the top jobs, but policy-making officials of whatever nationality must not only be of the topmost quality, they must remain, and be seen to remain, independent of member states and neutral between them. Loyalty to the European ideal is important, together with a high degree of technical expertise, political sensitivity, a detailed knowledge of the policies and legislation of at least one member state, and the ability to work in more than one of the official languages of the Community.

Such paragons are not always easy to find in the numbers appropriate for each member state. The competitive examinations at professional entry level are tough. Whilst Community salaries and tax advantages are attractive to people from some member states, for others they seem barely adequate, especially to compensate for the domestic dislocation that expatriate life entails.

The working environment of the Commission, combining the cultural and administrative styles of 12 different nations and nine official languages, is challenging. The work of furthering European integration in a way and at a rate acceptable to the governments and people of 12 nations, as distinctively different as say, Germany and Greece, is demanding. Yet the Eurocrats are subject to even more bureaucrat bashing than national civil servants. They are the targets of the popular press and politicians looking for alibis in no less than 12 countries.

For all the difficulties, the Eurocrats can take comfort in the importance of their work. Their contribution to an organization that is unique in political science, and that is transforming modern Europe, may yet prove almost as important to the United States as to the Europeans in whose service the Eurocrats labor.

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TRADE FOCUS/BRUCE STOKES

1992 and Beyond

Within the Bush Administration and on Capitol Hill, there is growing concern that without American vigilance, the effort by the European Community (EC) to create a single, barrier-free internal market by 1992 will end up as a protectionist "Fortress Europe" inimicable to U.S. interests.

This focus on 1992 is not without good reason. Europe absorbed 24 per cent of U.S. exports in 1988 and roughly 40 per cent of total U.S. direct investment abroad. Directives emanating from the EC's headquarters in Brussels will profoundly shape the fortunes of U.S. service, manufacturing and agricultural interests for years to come. But Washington's current obsession with the details of EC standard-setting and regulatory harmonization could lead U.S. policy makers to miss the forest for the trees.

"The fortress-mania presently apparent in the United States can be counterproductive," Albert Bressand, managing director of Promethee, a Paris-based business think tank, said in a recent interview. "The implications of the 1992 process [must] be analyzed in a broader perspective. The greater challenge for the United States is not a Europe that would fail to break away from a number of well-known protectionist trends, but a Europe that would break away from them in innovative ways."

Blinded by a decade-old vision of a sclerotic Europe, Washington has failed to note that a new generation of Europeans is busy crafting fresh approaches to many problems—such as regulatory reform and economic restructuring—that bedevil all industrial societies. If they are successful, and if American business and government ignore these broader lessons of the 1992 exercise, the United States may wake up to find that Europe has not only created a unified market, but has used it as a springboard to leapfrog ahead of this nation in key areas of public policy.

The Reagan Administration launched the deregulation and regulatory reform revolution in the early 1980s, but it is the Europeans who are poised to carry it into the 21st century. Continental Europe's economic planning tradition is enabling it to integrate a new commitment to a free market with a continued attention to infrastructure development—in the transportation sector, for example, where plans are in the works for construction of high-speed rail systems. Contrast this with Washington's failure to invest in new airports despite a dramatic increase in air traffic as a result of deregulation.

Similarly, Britain's orderly deregulation of its telecommunications industry is much more likely to be a model for the future than the chaos that followed the breakup of the American Telephone & Telegraph Co. And a concept of mutual recognition of national standards and testing, which would avoid endless bickering about regulatory harmonization, is emerging in Europe. This approach is likely to have a profound effect on future international efforts to create truly global markets for goods and services.

The creation of a larger, single European market will inevitably step up the pace of mergers, acquisitions, foreign investment and plant closings. The response in Brussels to this corporate reshuffling may provide a uniquely European model for the continued economic restructuring facing the United States as American industry gears up for more international competition in the years ahead.

In reforming its competitiveness policies, for example, Europe may follow West Germany's lead and permit banks to own commanding blocks of stock in manufacturing operations. Such a policy would effectively frustrate unfriendly takeovers. In that event, could the United States afford to keep regulatory policies that give U.S. firms less protection, especially with Japan also permitting such interlocking relationships?

Or, to cite another example, Western Europe's strong economic safety net of unemployment assistance and the like, which was widely criticized in the early 1980s as part of Europe's competitiveness problem, could turn out to be an ace in the hole in the 1990s by helping to minimize public opposition to business restructuring.

Finally, the 1992 process may establish business-related social policy precedents that the United States would be hard put to ignore. EC proposals to harmonize various national rules governing working conditions and labor relations could force U.S. multinationals operating in Europe into activities such as labor participation on boards of directors. If such practices do not impede their competitiveness in Europe, how will U.S. corporations continue to deny them to American workers? Similarly, the U.S.-EC dispute over hormone additives in beef is likely to be the first of several conflicts over environmental, health and safety regulations, with the EC setting stricter guidelines than the United States does. Will a post-1992 European market of 325 million consumers drive future product standards throughout the world, much as the U.S. market once did?

With their 1992 undertaking, "Europeans may have initiated the first large-scale rethinking of international economic cooperation since the U.S.-sponsored initiatives that laid the ground for the postwar reconstruction and prosperity," Bressand said. And ironically, he said, in the process of doing so, "Europe is poised to implement changes that Americans have painstakingly advocated and to do so with a more powerful set of tools than the United States has considered appropriate or even thinkable."

Faced with that prospect, at least some business leaders in the United States are beginning to look past the Washington-Brussels squabbles of the moment to fix on the bigger picture—to see what the United States can learn from the 1992 exercise about the shape of the world to come.

"I've never put much faith in [the Fortress Europe] argument," Richard E. Heckert, chairman of E.I. du Pont de Nemours & Co. and the National Association of Manufacturers, said at a recent meeting with reporters. "I don't think there is anything threatening in EC '92."

Indeed, Heckert concluded, "Maybe there will be some good role models, some maps drawn" that U.S. companies can profit from. That is a perspective on Europe 1992 that more officials in Washington might profitably adopt. ▭

Department of State Bulletin, January 1989, pp.16-18

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The European Community's Program for a Single Market in 1992

Atlantic Ocean
DENMARK
Copenhagen
North Sea
IRELAND
Dublin
UNITED KINGDOM
London
NETH.
Amsterdam
Bonn
Brussels
BELGIUM
Luxembourg
Paris
LUX.
F.R.G.
FRANCE
ITALY
Rome
PORTUGAL
Lisbon
Madrid
SPAIN
GREECE
Athens
Mediterranean Sea

Since its origins in the 1950s, the European Community (EC) has moved continually toward greater economic integration. However, each EC state has maintained many of its own industrial standards, taxes, and other features of national economic sovereignty that have complicated the free movement of goods and services within the Community. Now, in an environment of increased economic interdependence, the 12 member countries [Federal Republic of Germany, France, Italy, Netherlands, Belgium, Luxembourg, United Kingdom, Ireland, Denmark, Greece, Spain, and Portugal] are working to remove barriers to the movement of goods, services, capital, and labor. If all goes as planned, the European Community essentially will become a single market of more than 320 million consumers by January 1, 1993.

The proposed EC single market would have many features in common with the 50 American States, which benefit from the efficiencies generated by the free flow of economic and human resources. Politically, greater economic integration would bind Europe closer together, a primary goal of the Community's founders. A single market also would enhance the influence of the EC institutions in relation to individual European governments. Nonetheless, the EC's political power would continue to be substantially less than that of the U.S. Federal Government.

Studies indicate that full implementation of the program would bring wide-ranging, advantageous structural adjustment in Europe, as well as gains in gross domestic product. Specific benefits are expected from:

- Supply-side effects—the direct cost savings from the removal of border barriers;
- Economies of scale in production for a larger market;
- Increased competition;
- Greater expenditure on research and development; and
- Demand side effects—lower prices, greater variety of products to stimulate consumer demand, and lower budgetary expenditures on government regulations.

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The EC's single market program significantly will affect U.S. business through new product standards, new laws and business regulations, stronger growth, and stiffer competition. Our mutual economic interests are huge: in 1987, U.S.-EC trade totaled $145 billion. Direct investment in each other's markets is estimated at $280 billion, and portfolio investment is even higher. American businesses should be preparing now to deal with a more integrated and stronger European Community.

U.S. support for European integration remains a cornerstone of our foreign policy. An open and vibrant Europe reinforces the common bond of democracy, strengthens the Atlantic alliance, and can be a powerful engine for economic growth. Some aspects of various proposals under discussion, however, have the potential to harm U.S. interests and move the world away from a multilateral trading system. Increased competition from within the EC could lead European businesses to seek more protection from outside. Senior EC officials have stated repeatedly that the program, as envisioned, will not result in an economic monolith but, rather, will generate dynamic competition. Nevertheless, as the single market evolves, the U.S. Government continues to consult with the EC and will take appropriate steps to prevent establishment of new barriers to foreign trade and investment. In addition, the U.S. Government is working with businesses and other interested groups to identify problems and opportunities that might arise in the new EC proposals and laws. Finally, we hope that the EC uses the program to promote increasingly open policies by eliminating remaining trade barriers such as quotas and restrictive standards. We believe the EC owes it to the world to be a champion of free trade.

The Single Market Program and Beyond

The basis for the single market program is contained in a 1985 White Paper by the European Commission which identified 300 directives (since reduced to 285) needed to remove physical, technical, and fiscal barriers among member states. The EC also has pledged to strengthen Community law to achieve and enforce an integrated market. The program received an important boost in 1987 with the entry into force of the Single European Act, which provides for qualified majority,[1] rather than unanimous, voting in the Council to adopt most legislation. The act also set the 1992 deadline for the program and expanded the Parliament's legislative role.

While the bulk of the program focuses on eliminating border controls and harmonizing standards for goods, significant progress is being made in other areas, such as the removal of barriers to free capital flows and provision of financial services, promoting airline competition, and the mutual recognition of professional diplomas. European integration, exceeding the confines of the single market program, will take the EC increasingly into environmental protection, law enforcement, and economic policy coordination. It also will strengthen existing common energy and transport policies.

Creating a true common market will involve a shift in policy and a significant transfer of authority from member state governments to the EC. So far, members have agreed to most of the single market program, partly because the Commission has insisted on an "all or nothing" approach. However, as more difficult subjects come up (e.g., the harmonization of taxation, the creation of a European central bank, or proposals for worker participation in firms), the Commission may encounter more resistance from individual governments. Also, political leaders throughout the Community have different ideas about the exact shape of a future integrated market and the accompanying political structures.

In some areas, such as tax harmonization, in which members are less willing to cede national sovereignty, all the elements of the single market will not be completely in place by the end of 1992. But Europe seems likely to proceed significantly along its pragmatic approach to integration within the next 4 years, and the momentum should add impetus to the removal of difficult barriers. As of October 1988, the Commission has proposed 204 directives (laws); 81 remain to be formulated. The EC has adopted 91 directives, and they are in various stages of implementation by member states. Lord Cockfield, EC Vice President in charge of the single market effort, wants virtually all directives to be presented to the European Parliament and the Council of Ministers by December 1988.

The present push for integration is driven by a series of forces that have not been present in earlier efforts to form a single market. European businesses have been strong supporters of the single market program since they realize that they cannot compete with companies from the United States, Japan, and elsewhere without a large home market. In anticipation, European business is reorganizing, as evidenced by a wave of mergers, takeovers, and modernizations. Citizens of

EC Public Opinion

As the single market program gains momentum, more people in Europe have focused on the EC's decisionmaking process and have concluded that the mechanism is not sufficiently democratic. The EC Commission, a nonelected body, identifies areas that need work and drafts proposals for submission to the Council and to the Parliament, which is the only directly elected body in the EC. Despite majority support for the process of economic integration, polls indicate three out of four EC citizens favor a referendum in which the question of European union would be decided by the public. A majority favors giving the Parliament full legislative power. Proponents of more openness in the EC use these poll results to demonstrate a growing backlash against the "democratic deficit" of the present process.

According to an EC poll, interesting discrepancies appear. The British and Danish peoples are the most reluctant to give the Parliament power to enact laws that would directly affect countries and about forming a European government that would answer to this Parliament. On the other hand, almost 70% of the Italian respondents would favor those steps. A majority of French, Belgians and Spanish also are willing to see more authority shifted to a European government and the Parliament.

Each member state has commissioned polls to gauge the depth of national understanding of the single market program. The French get highest marks, showing almost universal awareness of the program and its aims. The German and British publics have about 50% awareness, while other countries tend to be somewhat lower. In response, many EC members have undertaken education campaigns, in part to position their businesses and publics for the more competitive environment after 1992.

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each member state slowly are becoming imbued with a spirit of "Europeanism." European leaders are responding to the political appeal of a more united Europe. Most importantly, EC members now accept more readily the long-term benefits of allowing market forces to determine adjustments to change and recognize this is easier with a large, integrated market. As West Europeans agree to common rules for trade, investment, and travel, their monetary and fiscal policies also will tend to converge further.

The 1985 White Paper underscores the Commission's obligation to take whatever steps are necessary to ensure the free movement of goods within the Community. For instance, Article 90 of the 1957 Treaty of Rome establishing the European Economic Community gives the European Commission the authority to issue direct orders to member states (without EC Council or Parliament approval) to allow competition in areas of market monopoly. Recently, the Commission used this tool to open up the market for telecommunications terminal equipment.

Common Agricultural Policy

Instituted in 1962, the common agricultural policy has allowed the EC to become more than self-sufficient in many agricultural commodities and has provided more stable incomes to the European farming population. The common agricultural policy today, however, consumes some 70% of the EC budget and—through its complicated network of protection, price supports, and subsidies—has created large surpluses of many agricultural products. EC export subsidies, used to dispose of some of these surpluses, have helped to create a distorted and unstable market in agricultural commodities. Over the years, EC products benefiting from the common agricultural policy have displaced some U.S. farm exports.

The single market program will have only a small direct effect on the common agricultural policy. The harmonization of agricultural health rules for animals and plants will reduce barriers that have kept the EC's agricultural markets somewhat segmented. As the Community eliminates border controls, it must act on the taxes or subsidies levied at the frontier on agricultural trade. Further monetary harmonization is likely to result in the elimination of the special agricultural exchange rates which also have served to protect markets from intra-EC competition.

Another effect of the single market program on the common agricultural policy will come as other sectors seek funds to ease the adjustment brought about by the program. An EC budget package adopted last winter, aimed at balancing the budget and reducing growth in agricultural expenditures over the next 4 years, resolved short-term budgetary problems by basically resorting to supply management techniques. While the package may reduce agricultural oversupply within the EC and help limit new pressure on international agricultural markets, it does not contribute significantly to the fundamental reform needed to create a system where farmers produce in response to market signals. The global reform of agricultural policies remains a U.S. objective and a major task of the current round of multilateral trade negotiations.

Specific Sectors

Industrial Standards. Although each EC state has its own set of industrial standards, the list of product categories covered by harmonization and mutual recognition is growing. The EC's new approach will mandate minimum standards and then require member countries to recognize other EC countries' standards. As an example, France recently was forced to accept German Edam cheese for sale, despite the fact that the cheese did not meet minimum French fat content. German beer purity laws also were found in violation of the "mutual recognition" concept.

Standards are a two-edged sword. On the one hand, the elimination of 12 separate standards and requirements allows Europe-wide marketing. On the other, new European standards could exclude foreign products from all EC countries. Clearly, standards can become barriers to trade.

The Commission has identified several high priority areas for harmonization of standards, including motor vehicles, tractors and agricultural machines, food industries, pharmaceuticals, chemicals, and construction. U.S. multinational companies established in Europe are better able to make their voices heard in the crucial area of standards setting than are U.S. exporters. The United States has been consulting with the EC Commission to achieve better access to the process for all our firms.

Government Contracts. The annual value of government procurement in the EC is estimated at about $550 billion, of which roughly 20% is subject to open tendering and only 2% awarded to non-national firms. The Commission aims to substantially open EC procurement practices by the end of 1992 and to extend competition into the telecommunications, water, energy, and transport sectors. It also has proposed to improve the remedies open to suppliers who believe that the contracting authority has violated their Community right to bid. An EC content rule of origin will be the likely vehicle used for limiting third-country competition. The U.S. Government will continue to press the EC to open up procurement to U.S. companies, both in bilateral discussions and in the multilateral trade negotiations taking place under the General Agreement on Tariffs and Trade (GATT).

Financial Services. The major thrust in banking is to create a single EC banking license and to agree on equivalent banking supervision standards. This would give a bank incorporated in any member state the automatic right to set up branches and or conduct cross-border transactions in any other member state, while remaining under "home country control" for legal and regulatory purposes. A Commission directive liberalizing non-life insurance transactions finally received Council approval in February 1988. Efforts to reduce restrictions in life insurance are scheduled to follow. The Commission also intends to facilitate Community-wide trading for stocks and bonds, including electronic linkages between West European stock markets.

In parallel with the liberalization of financial services is a separate effort to free the movement of capital within the Community. In November 1986, the Council liberalized long-term flows, such as loans and securities. In June 1988, EC Finance Ministers decided to remove all remaining barriers to short-term capital movements within the Community by 1990 (Spain, Portugal, Greece, and Ireland by 1992). EC members also are discussing the possibility of a European Central Bank and a single currency. It is unlikely that any form of unified EC banking authority could be achieved without first extending the European monetary system to include all the EC currencies and strengthening the European currency unit.

Transportation. A series of EC domestic air transport liberalization measures took effect in January 1988. Designed to increase competition, the package contains three major elements: measures allowing airlines to reduce fares on intra-EC routes, increased access to certain routes through "multiple designation" measures, and greater flexibility in passenger-sharing arrangements. Block exemptions from these rules are allowed for certain kinds of agreements, such as those for computer reservation systems. This package is regarded as a first step and is valid for 30 months, with a commitment to revise the measures subsequently. Maritime transport legislation took effect in July 1987, with major changes to be phased in through the end of 1992. Key features are the reduction of cargo-sharing arrangements, measures to address unfair pricing by third-country carriers, and common action against third-country offenders. Road transport measures are farther advanced, with a single customs document for truckers and agreement on deregulated competition.

New Technologies and Services. Four areas are covered: television broadcasting, information services, payment cards, and electronic payment. A "Television Without Frontiers" directive regarding TV broadcasting was proposed in 1986, significantly including a "European content" rule. The Commission also has proposed a decision to encourage the development of the information services market, such as better use of data bases.

Telecommunications. Although not covered expressly in the single market program, the EC is making slow but steady progress toward liberalization in this sector. Recently, the Commission ordered member states to open up competition in telephone and other user equipment. Further directives are promised on services, compatibility of standards, and government procurement of telecommunications equipment.

Social Programs. Significant by its absence from the EC's 1985 White Paper was any mention of social issues, such as workers' rights, health and safety in the workplace, unemployment, and training. The Commission has remedied that by recently proposing 80 steps addressing social concerns. Chief among them are provisions to allow workers to participate in some corporate decisionmaking and a standard labor contract. The Commission has said that these proposals would not be applied to EC companies in non-EC countries (unlike a highly controversial earlier proposal). European trade unions have welcomed this package: previously they complained that the single market was a program designed only for business. Labor is an important sector for the EC to "win over." There does appear, however, to be substantial early opposition from some countries to the broad scope of some of these social proposals.

The European Community and the United States, 1987

	Population (millions)	GNP ($ billions)	Per Capita GNP ($)	U.S. Exports to EC f.a.s. ($ billions)	U.S. Imports from EC c.i.f. ($ billions)
EC	**323.62**	**4,120.2**	**12,732**	**60.6**	**84.9**
Belgium-Luxembourg	10.27	144.7	14,090	6.2	4.4
Denmark	5.12	97.5	19,041	0.9	1.9
France	55.61	846.9	15,229	7.9	11.2
Germany	60.99	1,129.9	18,526	11.7	28.0
Greece	10.01	45.9	4,584	0.4	0.5
Ireland	3.56	25.6	7,180	1.8	1.2
Italy	57.36	632.1	11,021	5.5	11.7
Netherlands	14.64	213.5	14,581	8.2	4.2
Portugal	10.35	33.4	3,229	0.6	0.7
Spain	38.84	284.0	7,312	3.1	3.1
United Kingdom	56.87	666.7	11,723	14.1	18.0
United States	**243.77**	**4,526.7**	**18,659**		

Source: U.S. Department of Commerce

EC Business Law. Proposals in this area will primarily affect EC subsidiaries of U.S. firms located in the EC rather than U.S. exporters. The impact on these subsidiaries essentially will be the same as on EC firms. The Commission wants to create an environment that allows companies from different member states to be able to cooperate more effectively. In promoting this goal, the Commission intends to harmonize the rules that apply to how firms operate. On the important issue of intellectual property rights, trademark and copyright regulations eventually will be harmonized. The EC will continue to examine and rule on mergers and acquisitions. In general, it hopes to use company law to promote economic and technical progress within the framework of a single market.

Health Standards in Agricultural Shipments. Border authorities generally apply their own national laws in regulating shipments of plant and meat products. The single market would allow free circulation of agricultural goods. Health standards would be enforced in the originating country for shipments within the EC and the point of first entry into the Community for imports from non-EC countries. Progress has been slow, however, in adopting Commission initiatives to harmonize regulations.

This could spark a number of trade frictions with the United States because of the importance of the European market for U.S. farm exports. U.S. agricultural exporters are concerned that EC health directives and regulations could be used to protect European products. In particular, they are watching to see the directives on pesticides and allowable pesticide residues on products. Two measures in the animal health field (meat inspection requirements and a ban on certain hormones) already have created trade problems for U.S. exporters. While the first issue has been resolved, the latter will induce U.S. retaliation if it becomes fully effective in its current form on January 1, 1989. The United States will continue to monitor EC agricultural directives and take appropriate steps to ensure that U.S. farm exporters do not become victims of discriminatory policies.

Taxes. The EC proposes reducing variations in indirect tax rates so that border controls no longer will be necessary to adjust indirect taxes as goods cross frontiers. It would establish a limited range for the value added tax in all member states. The proposal faces significant resistance because of the wide variety of value added tax rates and differences in the products covered. Corporate taxation also is a controversial issue. Agreement on taxes requires a unanimous vote of the Council.

Energy. Creation of an internal energy market long has been a goal of the EC. Issues include the sale of electricity across borders and directly to companies, common carrier gas and oil pipelines, tax harmonization, environmental protection, and security of energy supplies. There has been little progress so far, although the European Atomic Energy Agency has responsibility in the nuclear energy field for safety and environmental standards and fuel supplies.

Reciprocity

The EC Commission has proposed requiring "reciprocity" from third countries before granting new rights in the single market, especially in areas, such as services, not governed currently by international trading rules in the GATT and the Organization for Economic Cooperation and Development. The Commission—still in the process of formulating policy on the implications of the single market program for non-EC members—has yet to define reciprocity. Some in the Community want to use the benefits of the program as negotiating leverage to open up foreign markets and to reach multilateral agreements favorable to the EC in areas not covered by the GATT. Others want to use reciprocity to protect EC firms from foreign competition. EC officials have suggested a number of possible standards for judging reciprocity, including national treatment, identical regulations, or a cross-sectoral balance of concessions.

National Treatment. The United States accords national treatment in virtually every sector and believes that national treatment should be granted unconditionally. However, the EC may make national treatment and the right to do business conditional on receiving the same treatment for EC firms in the foreign country.

Identical Treatment. Some in the EC want firms operating abroad to receive the identical treatment and rights that the EC would extend to foreign firms. For instance, in banking the EC might seek an exemption from our restrictions on bank activities. The United States would argue strongly that nations have differing regulatory views on how best to serve and protect the public, and U.S. firms should not be excluded from other markets because of such differences.

Overall Balance of Concessions. The EC could adopt some measure of "overall reciprocity" based on the degree of market access provided EC firms in specific foreign markets or the magnitude of the concessions offered by individual foreign countries in the current multilateral trade negotiations under the GATT.

APPENDICES

History of European Integration

The peaceful union of European states had been a dream for centuries, but not until the devastation of World War II was political cooperation perceived as necessary to ensure Europe's survival. National governments nevertheless remained reluctant to cede any substantial authority to a supranational body. In the political sphere, the Council of Europe was organized in 1949 by 10 European countries, but all decisions were made by unanimous agreement of the ministers of each member state, effectively weakening the Council. Militarily, the North Atlantic Treaty Organization, an alliance of most West European countries with the United States and Canada, was formed in 1949.

On the economic front, the European Coal and Steel Community, ratified by the Governments of France, the Federal Republic of Germany, Italy, Belgium, the Netherlands, and Luxembourg (the Six), began functioning in 1952. It was the first international organization with an integrated federal governing body. Attempts to create an overarching supranational authority to make political and economic decisions in the interest of the whole continent were blocked, however, by the British and Scandinavians who preferred international cooperation rather than formal integration.

In 1957, the Six agreed to establish the European Economic Community (EEC) and the European Atomic Energy Community (EURATOM). The two new organizations started operating in January 1958. The EEC, also known as the Common Market, began the difficult process of eliminating all trade barriers among its members.

The three communities were united in the European Communities (also referred to as the European Community) in 1967. By that year all member-to-member tariff duties were completely abolished, and a customs union of the Six was established. The customs union has been extended as new members joined the Community.

The United Kingdom initially rejected EC membership because of its Commonwealth ties and its desires to create a larger free trade area. It and six other European countries consequently formed the European Free Trade Association, which was designed to boost nonagricultural trade among its members and to provide a united platform for relations with the EC.

By the late 1960s, the British decided to join the Community. Although a French veto temporarily blocked British membership, in 1973 the United Kingdom, along with Denmark and Ireland, was admitted into the Community, creating the EC Nine. Greece joined the Community in 1981. The most recent expansion occurred with the addition of Spain and Portugal in 1986, resulting in the current EC Twelve.

Institutions

The major EC institutions are the Commission, the Council of Ministers, the European Parliament, and the Court of Justice.

The Commission. The Commission, headquartered in Brussels, is comprised of 17 commissioners appointed by their national governments. (France, West Germany, the United Kingdom, Italy, and Spain each appoint two.) Members of the Commission act independently of their governments and represent the interests of the Community as a whole. The Commission's major responsibility is to oversee the implementation of the EC treaties. The Commission proposes EC policy to the

Council of Ministers and steers its proposals through the Council and the Parliament. The Commission also prepares the preliminary draft of each year's EC budget. The approved budget for 1987 was about $45 billion. The budget is financed by a customs duty, a 1.4% value added tax collected on the goods and services consumed in member states, and a percentage donation based on member countries' gross national product.

The Council of Ministers. The Council, which has its secretariat in Brussels, is the body that approves all Community legislation. The Council does not initiate legislation: it can act only on proposals from the Commission. The Council issues the draft EC budget for approval by the European Parliament. Most voting by the Council is now by weighted majority, except in cases involving health, environmental, or taxation issues, when unanimity is required. Each country assumes the Council presidency for a 6-month term, rotating by alphabetical order of states.

The European Parliament. The Parliament is the only EC institution that directly represents the people of Europe. The Parliament has gained a greater role in EC decisionmaking in recent years. It has significant power over budgetary matters (except agricultural spending) because it can amend or reject the budget and approves its adoption. Since 1987, the Parliament has had the right to amend or reject legislation approved by the Council, which can overrule the Parliament only by a unanimous vote. Direct elections to the Parliament have been held since 1979. Deputies are elected to 5-year terms. The 518 members sit in eight major transnational political groups ranging across the political spectrum.

The Court of Justice. The Court of Justice has a role similar to that of the U.S. Supreme Court. It enforces EC treaties, determines if Community legislation is interpreted and implemented correctly, and resolves conflicts between Community and national laws. The justices have played a major role in the process of removing barriers to the right of business establishment and to the movement of goods and people. Court decisions generally have extended rights embodied in the treaties to individuals, strengthened EC institutions, and promoted integrated EC policies. The Court's decisions, by simple majority, are binding on all parties and are not subject to appeal. The 13 justices sit in Luxembourg and serve renewable 6-year terms.

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[1] EC member states have a total of 76 votes in the EC Council: West Germany (10), France (10), Italy (10), U.K. (10), Spain (8), Belgium (5), Netherlands (5), Greece (5), Portugal (5), Denmark (3), Ireland (3), and Luxembourg (2); 54 votes are necessary for a qualified majority and 23 votes for a blocking minority. ■

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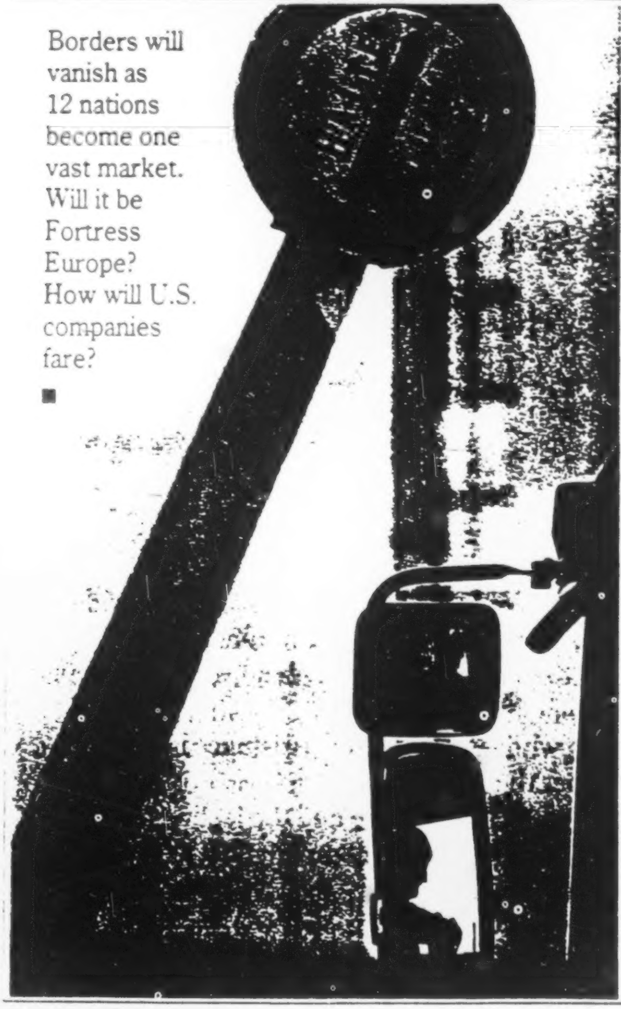
RESHAPING EUROPE

Borders will vanish as 12 nations become one vast market. Will it be Fortress Europe? How will U.S. companies fare? ■



Think of Europe as giant board game Now pick it up and jiggle it. Watch buildings, people and money spew across borders. New offices tumble toward the southwest—many landing in Spain. Clusters of people bunch toward the center, along the Rhine. Some money, machinery, and computer programmers even spill into the Communist states in the east, but no one really seems to mind.

The jarring and elbowing will continue for years, but even now the outlines of a new Europe are beginning to emerge. In some areas, such as financial deregulation, the die will be cast by next year. The first stage of what the Europeans call 1992, and what the rest of the world calls the European bloc, Fortress Europe, or simply the New Europe, has arrived.

CONFIDENCE. The New Europe is first and foremost the product of a Continent-wide economic deregulatory movement, where hundreds of rules that should have been dumped long ago are finally getting swept away. It is also the result of a shift in political attitudes favoring less government in the economy and in personal lives. No matter how you slice it, the intellectual premise behind the drive for a new Europe is that less day-to-day government is a good thing.

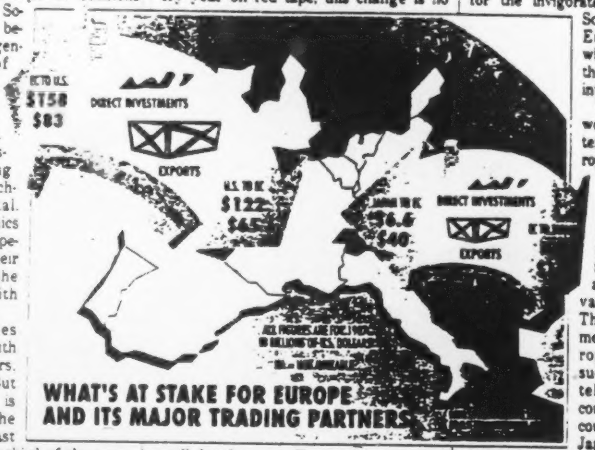
What's more, the changes come from a better feeling among Europeans about themselves. Not since the Golden 1960s, when dreams of a common Europe seemed infinite—but came crashing down under heaps of regulations, outsized social spending, nationalistic squabbling, and two oil shocks—have Europeans shown so much confidence. "No one talks about Europe as a broken economic machine anymore," says Jean-Louis Beffa, CEO of Saint-Gobain, the French glass and packaging giant. "Just that psychological change gives Europe a real chance to go forward."

No one expects the Europeans to

(1)

1992 AND BEYOND

erase their cultural and national differences to form a United States of Europe. But their commitment to hang together is a historic attempt to reassert their position against the industrial might of the U.S. and Japan. It also reflects a recognition that Europe needs a bigger voice in the balance-of-power decisions of the U.S. and the Soviet Union. Partly because of a 1992-engendered sense of confidence, the Europeans are showing more independence from the U.S. in dealing with Moscow and are supplying the Soviets with technology and capital. Thus in both economics and politics, the Europeans are asserting their right to drive the West's relations with the East.



WHAT'S AT STAKE FOR EUROPE AND ITS MAJOR TRADING PARTNERS

A BREAK. Bad times could come again with recession, trade wars, or another oil jolt. But these days the tide is running strongly the other way. In the past three years about one-third of the regulations that prevented the 12 member countries of the European Community from opening up their markets have been removed. Even though those rules were the easiest to undo, their elimination is already having an impact. Europe's bureaucrats are making the changes stick—and pushing the creation of a single market of 320 million people well on its way.

One breakthrough is in mergers. In early November, West German electronics giant Siemens crossed the channel to team up with Britain's top electronics company, General Electric Co. With their bid to buy rival Plessey Co., corporations in two of the Old World's most protected industries—telecommunications and defense—could soon be joined across borders.

Another change will make it much easier to deliver goods. In January, for the first time since Napoleon, drivers hauling cargo from Amsterdam to Lisbon will be able to clear four border crossings and five countries by showing a single piece of paper. Today they need two pounds of documents. In a market where billions of dollars are wasted every year on red tape, this change is no small development. Europeans soon may be able to travel internationally simply by flashing a European passport and a driver's license valid in all EC nations. And before long they may be able to plug personal computers into any wall socket and wire modems to any phone system in Europe.

The idea of a new Europe is affecting thinking abroad, as well. American corporations, many of them in Europe since the postwar surge, are gearing up for an onslaught of competition. Smaller U.S. manufacturers that depend on exports are drafting out their strategies for the invigorated European market. Some are diving into European operations, while others wait for the pieces of 1992 to fall into place.

Outsiders are also worried about the potential for Fortress Europe—that lower barriers inside will only lead to thicker outside walls. Europe itself is divided on this point. Some prominent executives, such as Fiat Chairman Giovanni Agnelli and Thomson's Alain Gomez, want to breed European champions in such key industries as telecommunications, computers, and autos to counter American and Japanese strength. That could lead to preferential treatment for locals. But other CEOs believe that isn't the best route to a place in global markets. "We are telling Brussels not to close markets," says Nixdorf Computer CEO Klaus Luft. While most agree that the threat of protectionism is aimed primarily at a flood of Japanese and other Asian imports, the danger is that others will get caught in the protectionist net.

Whatever its final shape, much of 1992 will already be in place by 1989. But what remains of the 1992 agenda is the most daunting part of all: the free flow of money, workers, goods, and services. As forging the necessary Europe-wide rules begins to trespass on national sovereignty, corporate interests, and labor unions, *realpolitik* is certain to emerge. The odds of realizing the full vision, it is clear, are long indeed.

Even Europe's optimists are humbled by the political tangles that are develop-

MULTINATIONALS
Who will prevail in the
U.S.-European contest? *Page 54*

NEW STRATEGIES
Heinz, Caterpillar,
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The hard decisions
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Tumbling barriers will
create brand-new markets *Page 72*

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■ EC HEADQUARTERS IN BRUSSELS: "NO ONE TALKS ABOUT EUROPE AS A BROKEN ECONOMIC MACHINE ANYMORE"

ing as deregulation begins cutting deep. Two political blocs are already forming within the Community: the free-marketeers of the North, anchored by West Germany and led by Britain's Prime Minister Margaret Thatcher, and the Socialist Mediterranean nations favoring an *économie mixte*, with French President François Mitterrand as the ideological ringmaster. Battles on such issues as airline deregulation and protected industries are shaping up along these lines.

Britain's Thatcher is the lightning rod for this conflict. She has lashed out at EC President Jacques Delors for what she fears are plans to remake Europe according to French interventionism and to increase the power of Brussels. Thatcher wants to see Europe as a free trade zone opened widely to trading partners in the U.S. and Asia. "We haven't worked all these years to free Britain from the paralysis of socialism only to see it creep through the back door of central control and bureaucracy from Brussels," she says. Her complaints could grow as the EC presidency, which rotates every six months, will pass to Socialists in Spain and France between now and 1990.

Delors, on the other hand, represents a crop of leaders who see government as a partner in the economy. While Socialists across Europe have become cheerleaders for market forces during the 1980s, they still favor limited state planning. For them, along with the indisputable gains from deregulation, 1992 means Europe-wide support of industry and a cautious welcome to outsiders. Says a top French Finance Ministry official: "1992 doesn't mean that government's role in the economy disappears. It has a legitimate part to play."

Without more political harmony, it's hard to see any breakthrough on two key 1992 dreams: unified taxes and a common currency. A smoothing of widely varying value-added taxes (VAT) into a range of 4% to 19%, from nothing to 38% now, is proposed to coincide with the dismantling of border stations. Because these taxes tend to hit luxury goods the hardest in southern Europe, a $17,500 BMW in Frankfurt costs $50,000 in Athens. VCRs in France will be taxed at 28% next year, while Germans are charged only 14%. If tax rates aren't standardized after goods begin to flow freely, VCR sales in France are certain to tank and wealthy Greeks will begin to fl first-class to Germany to shop for cars.

POLITICAL MIRE. As things stand now, dropping barriers overnight would hi the French like a tidal wave. With one o the highest VAT rates in Europe, France counts on the consumption tax for 40% of government revenues. And that fac has led to an embarrassing reversal by the avidly pro-Europe French government. Dismissing the European tax plan as "foolish," Prime Minister Michel Rocard and other officials are likely to seek delays long beyond 1992. Yet one condition of German Chancellor Helmut Kohl's backing of the 1992 scheme is a lower and homogeneous VAT system.

Hopes for a single currency managed out of a European central bank are also mired in politics. Mitterrand's supporters are the big promoters of this cause: They think a single currency would be more stable against the dollar and the yen and would thus permit them to have lower interest rates. Moreover, the French argue that German economic prudence would be adopted across Europe through a single currency.

That kind of talk gives the Bundesbank the jitters. German monetary authorities are reluctant to team up with

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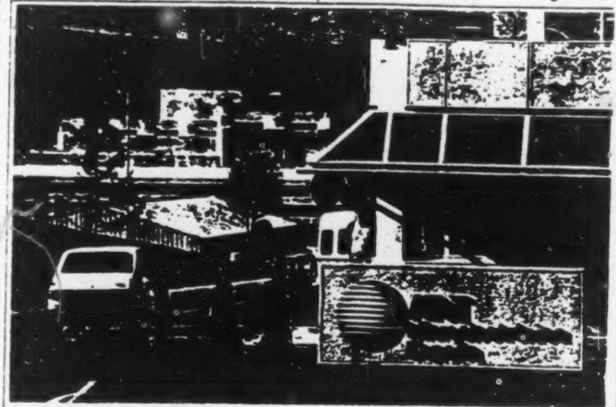
other, less independent European central banks. And, deep down, the Germans don't believe the political will exists across Europe for prudent and conservative economic policy. Across the channel, meanwhile, Thatcher maintains steely resistance to bringing the pound into the existing European Monetary System, much less submitting it to European central bank control.

While the titans wrestle to create a level playing field for corporate Europe, few are looking at the potentially explosive effect of 1992 on small and midsize companies. While local rules, not EC codes, prevail, the new emphasis on a single Europe could help steamroller the small shopkeeper. One of 1992's big promises is that vanishing borders will improve distribution. Such retail giants as France's Carrefour and Germany's Aldi group are already on a march across borders with huge stores called hypermarkets supplied by warehouses with computerized inventories. They also have big ad budgets. That could spell the slow death of shopkeepers and even midsize retailers, which today hold up to 80% of retail sales in southern Europe.

Meanwhile, lack of progress in putting Europe together may be all that's preventing a backlash from labor. Recently unions have begun lobbying Brussels for their own new deal, called "Social Europe." The threat to labor is clear. Higher unemployment is certain in the early stages of a more efficient Europe. On top of already distressing joblessness, such as France's 10.5% rate and the Netherlands' 14%, more unemployment could be politically explosive. German truckers are already protesting deregulation of their industry, which will allow more efficient Dutch rivals to operate freely inside Germany.

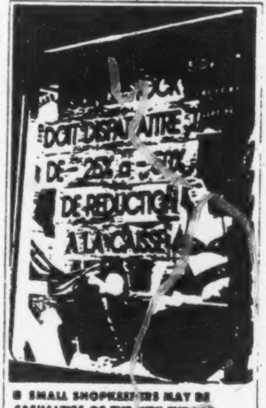
Unions also fear the free movement of capital seeking lower costs. Look at the investment boom in Spain, which made the country No. 2 in growth in the EC last year. Following Peugeot, Renault, and Volkswagen, Ford just plopped down $68 million for a components plant in Cadiz. American Telephone & Telegraph Co. is spending $200 million on a microchip plant near Madrid, and GE is investing $1.7 billion to make plastics near Cartagena.

The problem is that wages and benefits are lower in Spain than in most of its neighbors and work rules are more flexible. In Germany, where wages and benefits are nearly twice those in Spain, workers worry about losing jobs to the south. While economists see the redistribution of jobs according to national advantages as a plus, unions view such shifts as a threat to hard-won bargaining power. Without a seat at the 1992 table, unions could shatter the Continent's relative labor peace. Says Michael T. Walsh, director of the international division of Britain's Trades Union Congress: "The question is whether benefits [of 1992] will be distributed fairly."



■ AT&T IN 1987 OPENED A $200 MILLION CHIP PLANT IN SPAIN, WHERE LABOR IS CHEAP

Can the Europeans get their act together? Assuming their economies can keep growing at the now-healthy 3% rate, the key is clearly politics. But even this early, a unitary Europe is becoming a force to reckon with internationally. Toned-up European companies have muscled their way into the U.S., quickening the pace of corporate takeovers. While instant superpower status is out of reach, it is clear that if 1992 works, Europe's cohesive economic clout will give it a stronger foreign affairs voice.



■ SMALL SHOPKEEPERS MAY BE CASUALTIES OF THE NEW EUROPE

Already, Europe is reaching out to redefine relations with the East. The incoming Administration is faced with a Europe yearning for more independent ties with Eastern Europe and the Soviet Union. Kohl and Mitterrand have launched their own initiatives for disarmament talks with the Soviets. And to Washington's consternation. Europeans are scrambling to become *perestroika's* leading financiers. Industrialists are pushing for a so-called Marshall Plan that would funnel new investment into the Eastern bloc in return for lower-cost production in its factories. "It's a belief that a prosperous Europe can influence the world economically," says a NATO official.

If political pressures sabotage 1992, the big question becomes whether half a loaf is better than none at all. If the side effects from deregulation hurt too badly, or if a recession hits, politicians are likely to compensate with new trade barriers. U. S. Ambassador to the EC Alfred H. Kingon, for one, worries about "what happens to 1992 during the next downturn. Nobody knows." One possibility is that the extreme right and left, sidelined at the 1992 party, would benefit from hard times. In France, for example, both the extreme right-wing National Front Party and the Communists are gaining from their anti-1992 stances.

But Europe's business leaders argue that even truncated deregulation will make Europe more efficient, less hidebound by government, and ultimately more competitive. In many ways it already has. And while the project is likely to fall short of its broadest ambitions, it could also take on a life of its own. Before long, Europeans won't be able to imagine a world without access to low-cost German mortgages, discount warehouse stores in Britain, or cheap air fares to Mallorca. At that point, there will be no turning back.

By Frank J. Comes in Paris and Jonathan Kapstein in Brussels, with John Templeman in Bonn and Elizabeth Weiner in New York

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Special Report

MULTINATIONALS

WILL THE NEW EUROPE CUT U.S. GIANTS DOWN TO SIZE?

EC companies are using 1992 to assault entrenched American multinationals

In 1967 a powerful little book entitled *The American Challenge* rocked the corporate boardrooms and political corridors of Europe. Written by French journalist Jean-Jacques Servan-Schreiber, it warned that America's fleet-of-foot multinationals would soon dominate the Continent because Europe's own giants were too mired in bureaucracy and high costs. The prophecy was never fulfilled. Over the next two decades many U.S. companies stumbled in Europe and came face to face with a challenge at home—the Japanese.

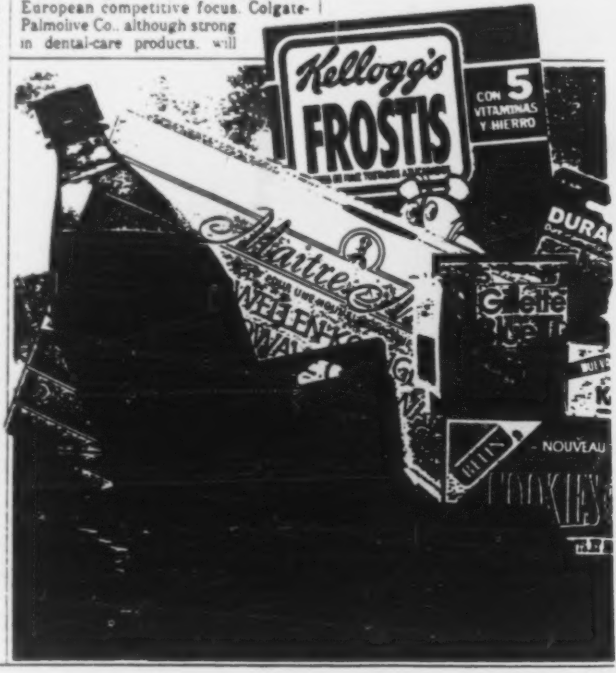
Now, with the rich promise of an integrated European economy at hand, the specter of *le défi Americain* looms once again. After restructuring through plant closings, mergers, and streamlined production, the biggest and best of U.S. multinationals are feeling fit. Some are more "European" than the Europeans. Coke and Kellogg are Continental classic brand names. Ford and General Motors vie for the top spot in autos. IBM and Digital Equipment dominate their markets. Americans "understand the concept of one market better than the European companies," says Servan-Schreiber, who now lectures at Carnegie-Mellon University in Pittsburgh. "They are ready for 1992."

Perhaps. But Servan-Schreiber's prediction may be no more right today than it was in 1967. To be sure, American companies are investing $19.7 billion this year on new plant and equipment in the European Community, up 39% from just two years ago and a sharp turnaround from the disinvestment of the early 1980s (chart). American multinationals also are aggressively restructuring their corporate hierarchies and product lines and hunting for acquisitions—all to exploit a common market that buys $600 billion worth of their goods and services.

'KICK IN THE PANTS.' But for the Americans to assume they will gain most from wider European markets is dangerous. The fact is that the battle for 1992 will be a decisive test of U.S. company strength. The political drive to bring down internal barriers is galvanizing European competitors to launch assaults on long-established U.S. positions. "1992 is giving European industry a kick in the pants," says Peter Sutherland, the EC's outgoing commissioner for competition. That includes attacking the rivals' home base: Although Americans spent $2.4 billion in 1987 acquiring European companies, Europeans spent $37.1 billion in the U.S., according to *Mergers & Acquisitions* magazine.

The Europeans are clearly cash-rich, in sharp contrast to many heavily indebted U.S. rivals who suffer from Wall Street's preoccupation with quarterly earnings. Apart from autos, computers, and some consumer products where Americans lead, U.S. multinationals will have to pull out of some product lines to sharpen their European competitive focus. Colgate-Palmolive Co., although strong in dental-care products, will have to run fast to keep up with W
Germany's Henkel group in the bruta
competitive detergents field. And
foods. "If you look at the 10 years ahea
the real powers will be Nestlé, Unileve
Heineken, and BSN," predicts Antoine
boud, chairman of Paris-based BSN.

German companies are particular
tough. Siemens, which is sitting on $
billion in cash, recently began its mo
comprehensive corporate restructuring
20 years and is mounting drives again
the likes of General Electric, AT&T, a
Westinghouse. Others, such as Britain
Imperial Chemical Industries, Fren
glassmaker Saint-Gobain, and Ang
Dutch food giant Unilever, are in sha
for 1992, with plants and sales offic



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placed strategically around Europe. Another tier of European companies, previously satisfied with their own national markets, is branching out with cross-border acquisitions.

Indeed, that is a central goal of Europe's drive toward a more thoroughly integrated internal market. From Britain to Italy, European companies are trying to loosen their parochial—and therefore vulnerable—anchors to a single national base. In industry after industry, Europeans hope to forge cross-border giants that will have the muscle to go head-on against the Americans. Siemens' proposed joint takeover of Britain's Plessey Co. in cooperation with Britain's General Electric Co. is the most ambitious step yet to create a European defense and technology giant.

SHIFTING WINDS. The net result of this girding up—on both sides—could be a major shakeout in virtually every industry. "In most industries there are too many competitors and too much manufacturing capacity," warns A. Steven Walleck, head of McKinsey & Co.'s worldwide manufacturing service. It's questionable, for example, whether Europe has room for half a dozen mass-market auto makers when the U.S. sustains just three. Likewise, an integrated Europe hardly needs 12 national airlines.

NIEUW
NOUVEAU

The trump card European companies hold is their ability to create political hurdles for the Americans. Multibillion-dollar fights will hinge on many of the nearly 200 measures still to be enacted by Brussels. Only a handful of the most sophisticated U.S. multinationals, such as IBM, can count on shaping the decision-making, either in Brussels or in national capitals. Worse, U.S. companies that fail to monitor the shifting winds inside the labyrinthine EC bureaucracy could make disastrous strategic decisions.

The Europeans also are certain to defend their national champions against the U.S. and Japanese competition. Computer makers ranging from Bull to ICL to Siemens are clamoring for help against successful U.S. rivals. The Europeans have a proven knack for supplying government assistance to embattled industries: They are helping Airbus ward off Boeing and are funding the new semiconductor consortium JESSI to help European companies compete against U.S. and Japanese chipmakers. Observes one U.S. executive: "For the De Benedettis and Agnellis of Europe, this is their foundation, their life or death. For American companies, the heart of the company will always be the U.S."

Moreover, simply throwing technology and money at Europe will not guarantee success. GE recently announced that it would build a $1.7 billion Spanish plastics plant, which comes on top of the $2.3 billion it paid last year to acquire Borg-Warner Corp.'s chemical operations, in large part for its European presence. GE executives say that by 1992 these investments will help narrow the competitive advantage held by such German chemical giants as Bayer and BASF. But one Bayer insider thinks GE is pursuing a "relatively risky strategy" by building too much capacity in an already crowded field.

'Many American businesses . . . think of Europe as a single market'

Likewise, American Telephone & Telegraph Co. is spending $200 million on a state-of-the-art microchip plant near Madrid in a joint venture with Telefónica, Spain's national telephone company. The intent is to supply specialized computer chips to all of Europe. So far, AT&T has made strong inroads in Spain but not far beyond Spanish borders, according to George W. Foyo, managing director of AT&T Microelectrónica. Why? "We were the new kids on the block," Foyo says. "We underestimated consumer loyalty. In Europe, a relationship is very important." AT&T also is having trouble cracking telecommunications markets in France, Italy, and Britain.

PALE IMITATIONS. Despite their missteps, the Americans have an advantage because they have long regarded Europe as a single, broad market. Although there are exceptions, the experience of the early 1980s, when U.S. managers had to make painful decisions at home, encourages them to move quickly to organize their European activities along the most economically efficient lines. Westinghouse Electric Corp., for example, is cutting back on mature products such as electrical equipment and focusing huge resources instead on such growth areas as refrigerated trucking, defense electronics, and environmental controls. In doing so, Westinghouse has reduced its European work force by about 50% since 1980. "We are leaner," maintains John B. Yasinsky, executive vice-president of international sales. "The Europeans have more to shut down."

It is this cultural predisposition to redeploy assets aggressively across national boundaries that traditionally has differentiated the Americans from many European competitors. "Many American businesses have an advantage in that they think of Europe as a single market," says Colgate-Palmolive's new European president, Brian Bergin, who is Australian. "The Europeans are in various stages of recognizing that."

SLOW START. Although many European giants have established global businesses, there are some vast gaps back home. One such industry is food. A recent study of 45 major European food companies by the MAC Group, a consulting firm, found that half of them were in just one or two countries and seriously lagged behind broader-based American or Swiss giants. Auto makers Peugeot, Renault, and Fiat have only pale imitations of the cross-European manufacturing presence established by Ford or GM.

There's a debate about just how fast the Europeans can build thoroughly inte-

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grated Europe-wide companies. Although there is much talk of forging cross-border champions, the best example so far is the combination of Sweden's ASEA and Switzerland's Brown Boveri—and neither nation is in the EC. It can take years to combine skillfully companies with divergent cultures and management styles. "We [Europeans] start from a disadvantage, and our problem is that we have to build an industrial structure quickly," says John Henry Harvey-Jones, former chairman of Britain's Imperial Chemical Industries PLC.

It is all shaping up as a titanic struggle. The Americans have an organizational headstart, but the Europeans are racing to overcome it. If economic growth is slack, many executives see an industrial Armageddon ahead in which scores of factories are closed and companies disappear. But if Europe's drive to integrat its economy results in the 3%-to-5 growth rate that's forecast, it is possibl that both U.S. and European giants wil reap the fruits.

By Richard A. Melcher in London an Gregory L. Miles in Pittsburgh, with Gai Schares in Bonn, Frank J. Comes in Paris, and William J. Holstein in New York

HEINZ SQUARES OFF AGAINST ITS ARCHRIVAL

Anthony J.F. O'Reilly, chairman of H.J. Heinz Co., is planning a European food fight. Although his $5.2 billion company is about one-sixth the size of big rivals Nestlé and Unilever, it has strong positions in ketchup, baby food, canned soups, and beans. To survive in a single Europe, O'Reilly plans to spend up to $1 billion on acquisitions, plant modernization, and marketing by 1992. A major goal: to push his frozen Weight Watcher meals across Europe.

That pits Heinz against Nestlé's Lean Cuisine. The two have been slugging it out in the U.S. for years. Now they are taking their gloves off in Europe, where O'Reilly expects rising ranks of working women to double the diet meal market to $1 billion in sales annually by 1992.

KETCHUP KING. Nestlé is No. 1 in frozen diet meals thanks to strong positions in Britain and France. But Heinz is using its broad local distribution networks to push Weight Watchers into Britain and Italy. Both have just begun to face off in Germany, the big prize. There, Nestlé has the edge, but Heinz is gaining by introducing dishes such as beef stroganoff and apple strudel. "It's going to be hand-to-hand combat," says O'Reilly.

Heinz also plans to transform itself into Europe's low-cost ketchup producer by extending its reach into markets beyond Britain, the Netherlands, and Belgium, where it's the ketchup king. That means going after BSN in France and tackling Nestlé and Kraft across the rest of Europe. To do that, Heinz may turn its British and Iberian plants into regional production centers. O'Reilly has spent $250 million in Spain and Portugal, mainly on ketchup-related acquisitions and plant expansion. The goal "is to make Heinz ketchup as ubiquitous a product as Coca-Cola," says O'Reilly.

Europe-oriented rivals such as BSN aren't as international but can be tough in specific markets. BSN has bought 14 foodmakers across the Continent since mid-1987 and is driving against Heinz in ketchup, mustard, and pickles. Nestlé and Unilever, on the other hand, so dominate Europe that a U.S. company such as Heinz has to tread softly. When Nestlé focuses on a specific product, O'Reilly quips the best thing to do is: "Duck." Heinz will clearly be doing a lot of bobbing and weaving as 1992 approaches.

By Gregory L. Miles in Pittsburgh, with Frank J. Comes in Paris and Ellen Wallace in Vevey, Switzerland

■ HEATING UP WEIGHT WATCHERS IN MUNICH: THE DIET MEAL MARKET MAY DOUBLE BY 1992

CAT'S FIGHT TO STAY KING OF THE JUNGLE

When Caterpillar Inc. decided last year to shutter a factory in Scotland, enraged workers occupied the plant for several weeks. They even led a bagpipe procession through Glasgow with a Cat bulldozer in tow, doused in pink paint.

But the plant closing, part of a worldwide cost-slashing effort, has helped the $8.2 billion maker of earthmoving and construction equipment reinvest heavily in its remaining five European factories and a parts distribution center. Cat's European sales increased to $1.4 billion last year, up from $1.07 billion in 1986.

CUSTOMS BREAK. Now, with 1992 looming, Cat's European market share of 35% to 40% in heavy equipment, depending on product line, may expand further. Caterpillar, for example, could benefit greatly if Europe's hodgepodge of product specifications were standardized. Any easing of customs requirements could also help Caterpillar because it has 300 trucks on Europe's roads every day.

These savings might enable Cat to price more aggressively against European rivals. That will be important as the earthmover competes for a piece of huge civil engineering projects such as the Channel Tunnel and road projects under way in France, Spain, and Portugal. "It's going to be survival of the fittest," predicts Lawrence Williams, chairman of Caterpillar Overseas SA in Geneva.

European competitors, such as Fiat-Allis, AB Volvo, and J.C. Bamford Ltd., are more regional. Cat's reputation also is so well established that its tractors, excavators, loaders, and other earth-hauling equipment can typically carry price tags 10% to 15% higher than European makes. Contractors easily recoup the difference by getting higher trade-in and resale prices.

That's not to say Cat will have an open field. Some competitors, such as Britain's Bamford, are scrappy. It controls the lion's share of the backhoe market at home and does well with that product throughout the Continent. Cat also faces stiff competition from Mercedes-Benz and Volvo in diesel trucks.

But Cat's biggest foreign rival remains Japan's Komatsu Ltd. The Japanese company recently opened its first European plant in Birtley, England, making excavators and wheel loaders. Komatsu and other Japanese companies could also become allied with European manufacturers against Cat. Fiat, for example, uses excavator technology from Hitachi Ltd. as part of a joint venture. Cat, to be sure, is in an enviable position, but it had better watch out for its tough Asian rivals.

By Brian Bremner in Chicago

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DEC: MAKING THE MOST OF VANISHING BORDERS

■ A FACTORY SITE IN SCOTLAND: EUROPE NOW PRODUCES 37% OF DEC'S SALES

With $19.6 billion in European sales, IBM has long dominated Europe's computer business. No one doubts it will thrive even more in an open European market. But what about other U.S. computer makers?

They, too, may be big winners. No. 2 Digital Equipment Corp., for example, is building a major base in Europe. Since Pier Carlo Falotti, a suave, soft-spoken Italian, took the helm in 1983, sales of DEC Europe have quadrupled to $4.2 billion. That's 37% of DEC's total sales, up from 25% when Falotti started. By 1993, DEC Europe is almost certain to overtake Germany's Siemens, the top European computer maker, with an estimated $5.7 billion in computer sales in 1987.

IBM and DEC have organizations that span Europe, as do such other U.S. companies as Unisys and Hewlett-Packard. By contrast, Germany's Nixdorf and Siemens, France's Bull, Italy's Olivetti, the Netherlands' Philips, and Britain's ICL are strongest on their home turfs.

BIG EDGE. DEC is investing heavily to deepen its presence, including a $100 million chip plant in Scotland. And it's moving fast to exploit the merger boom that is creating giant leaders in many industries. Each time two companies get together, they combine their systems. That spells opportunity—or disaster—for their suppliers, and DEC is proving adept at the game. When Sweden's ASEA and Switzerland's BBC Brown, Boveri & Co. merged into an electrical equipment giant, DEC combined its account teams in those countries to get the lion's share of the new company's computer business.

DEC figures that European, if not global, product offerings will be a big advantage. "Multinational companies want to be able to hook up Paris and Frankfurt with, say, Tokyo and New York," says David Stone, a DEC strategist in Geneva. "And then they say, 'By the way, we want to be able to go from French to Japanese and German to Japanese.' "

DEC is also displaying savvy whe comes to software. Take the seemi simple matter of checking spelli DEC's PC software now checks spelli in several European languages, and adding more. That's no small progr ming task if you consider that Fin nouns have 16 grammatical cases, e of which can change the spelling.

DEC will have to play its politics ri too. Many Europeans fear the d nance of IBM and view DEC as a "g guy" alternative. But if sales k booming, Europe could start to find DEC just as worrisome as Big Blue.

By Thane Peterson in Ge

FORD IS READY TO ROLL IN THE NEW EUROPE

Fiat has a lock on the hearts of Italians, Peugeot and Renault dominate the French market, and Volkswagen holds a special place in Germany. But no auto maker can claim to be more European than Ford. As far back as 1967, Ford began pulling together a splintered and often competing network of sales and production operations into a truly European auto company. "They are considered as European as any company can be," admits Victor Dial, executive vice-president of Peugeot.

Its pervasive European presence clearly gives Ford a head start against revitalized European competitors and the looming Japanese as 1992 approaches. Ford of Europe Inc.'s 22 plants stretch from Wales to southern Spain. Its sales offices in each European country tailor marketing and design strategies to local tastes. Fresh from a $1 billion profit year on sales of $17 billion, Ford is planning to go on a $7.5 billion spending spree in Europe over the next five years to maintain its position. Part of that will be spent redesigning all Ford's European models by the mid-1990s.

BIG DENTS. The advent of 1992 should create some advantages for an efficient producer like Ford. Quicker transportation, fewer headaches at customs, and more standardization of components will make big dents in inventories and enable the company to experiment with sourcing and production. Ford also is looking at combining some of the bookkeeping functions of its separate sales companies and may consider a European credit operation. "All of this should have a very important impact on our cost base," says British-born Ford of Europe Chairman Alex J. Trotman.

Still, Ford's strength will be tested. Archrival General Motors Corp. finally has gotten its act together, unveiling a much-improved product line. Renault and Peugeot have ruthlessly slas costs and are flush with cash. Peugeo beginning to gain market share outs of France. VW is taking an ax to its la costs in Germany while increasing put in Spain. Fiat, rich and dominan home, can be expected to attempt a jor push outside Italy.

There also are two dangerous cards. After four boom years, many servers expect next year to begin long-awaited slowdown in auto s That could bring on another round cost- and price-cutting. More unsett is the specter of increasing protectio Europe's auto market. Although the rent talk of quotas is directed at Japanese, Ford has no national pa inside Europe to support its interests any kind of desperate struggle for vival, European governments would tainly back their national champi But even if pressures intensify, F has something no other company can plicate anytime soon—a reach across heart of Europe itself.

By Richard A. Melcher in Lo

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SHOULD SMALL U.S. EXPORTERS TAKE THE BIG PLUNGE?

New rules for 1992 force them to weigh the risks of building abroad—not just selling there

It's a strategic dilemma of the first order. America's hottest exporters are small niche players who make a handful of things and make them well, whether high-tech gear, special fabrics, or custom-made machine tools. Thanks in large part to these companies of under $400 million in sales, U.S. exports to Europe are surging.

Enter the 1992 fear factor. Even if the Europeans do not impose outright tariffs or duties, smaller U.S. exporters will face growing pressure to match European standards, establish European identities, and have more European content in products. There lies the dilemma: Should they take the plunge and set up full-fledged manufacturing in Europe? "Small to medium-sized companies are coming to us and saying, '1992! 1992!' " says Charles Valentine, a partner at Arthur Young & Co. who advises smaller exporters. "It's almost like warning that the British are coming."

The argument for keeping output at home is that U.S. labor costs are generally lower and the cheap dollar makes American-made goods competitive. Establishing an expensive European plant when the rules of the game are unclear and many competitive shakeouts loom could be foolhardy. Yet simply staying home may be risky if a big chunk of a company's sales are in Europe, and the competition is rigging the rules for 1992.

To find out how American exporters are responding to the 1992 challenge, BUSINESS WEEK reporters surveyed companies from Boston to Beaverton, Ore., whose annual sales range from $2 million to $400 million. All are niche players that make the overwhelming majority of their products in the U.S. Just-like la
er multinationals, they are being forc
to make decisions that will affect h
they fare in the Europe of 1992.

☐ **The plungers.** At first glance, ther
not much in common among Thom
Buck, who runs a family textile busine
in New Jersey, William E. Gibson,
high-tech cowboy in California's Silic
Valley, and Richard W. Muzzy, a frug
plainspoken maker of truck hitches
Michigan. But all of them run compan
with less than $100 million in sales.
exporters, they're setting up their fi
plants in Europe, in part to circumve
protectionist pressures. "There is
trend toward Europe for the Euro
ans," says Buck, whose Filament Fi
Technology Inc. has plans for a $5 m
lion polypropylene facility in France.

Even small businessmen like Buck c
pull off sweetheart deals in Euro
these days. Buck holds the patent for

■ GIBSON OF DIGITAL MICROWAVE: HE EXPECTS TO USE BRITAIN AS A SPRINGBOARD TO EXPAND SALES ON THE CONTINENT

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unique lightweight fabric for sportswear, and the French want some for their own apparel industry. He also agreed to take over an unused facility in Valenciennes, a hard-hit coal and steel area. Result: He got $3.5 million in French government grants and loans and was able to borrow much of the remaining $1.5 million. He will use nonunion labor that costs him about the same as he pays in North Carolina.

Both Gibson, president of Digital Microwave Corp. of San Jose, Calif., and Muzzy, president of Holland Hitch Co. of Holland, Mich., are making relatively small $2 million investments, but they have high hopes for these toeholds. Gibson, who already earns about 60% of his $60 million in revenues from Europe, hopes to defend his relationship with two British communications companies by setting up a digital microwave radio and optical-fiber plant in Scotland. From there, Gibson wants to use Britain as a springboard for more sales throughout Europe. Likewise, Muzzy hopes that establishing a small plant in Germany to make coupling devices for large tractor-trailers will solidify his relations with major customers Renault and Daimler-Benz and help triple European sales.

☐ **The stay-at-homes.** H. Joseph Gerber doesn't buy the argument that small guys have to invest in Europe. Austrian by birth, Gerber is president of Gerber Scientific Inc., a South Windsor (Conn.) manufacturer of high-tech equipment for the apparel, electronics, and other industries. Europe accounts for 24% of his $264 million in sales. Gerber, who started his company while in college, does not rule out the possibility of ever investing in Europe. But for now, he says, "if the dollar is low and salaries are higher in Europe, it might behoove us to stay here and get our costs down low enough where we can easily pay a tariff and still come out ahead."

Indeed, machinery and machine tools are among the hottest areas of export growth to Europe, and executives in these industries say they have little reason to manufacture there. They tend to make one-shot sales and don't have to take currency risks. Many machinery makers are so specialized they could sell their products in Europe even if new tariffs were applied. Menlo Tool Co. in Warren, Mich., for example, makes special cutting tools and won the President's award for exporting. Overall, 12% of its $3 million sales are in Europe. But a manufacturing plunge is not in the cards. Says co-owner Frank M. Kastelic Jr.: "We do a very good job of controlling the world market from the U.S."

☐ **The middle path.** Between the two extremes, however, lies a broad swath of exporters who want to follow a middle path: setting up better distribution and marketing systems, bolstering service networks, and establishing joint ventures with European partners. These steps help fashion better European identities without incurring big risks. The experts support that approach. "My advice to smaller American companies: Go slow. Understand what's going on," says Stephen Payne, North American chief executive of the PA Consulting Group.

■ E-Z-EM'S STERN: "1992 GIVES US AN IMPETUS" TO SET UP A EUROPEAN BASE

For Pittsburgh-based Extrel Corp., a $15 million maker of mass-spectrometry instrumentation, the middle path means trying to more than double European sales and strengthen sales and servicing networks in eight EC countries before 1992. Medical-product niche players like E-Z-EM Co. of Westbury, N.Y., and Medrad Inc. of Pittsburgh, which depend on European exports for 12% and 10% of their sales, respectively, also are concentrating on distribution.

After a formal review of its international strategy this summer, $60 million-a-year E-Z-EM geared up a sales office in Britain to reduce its dependence on distributors. It also has started subcontracting to British manufacturers to see whether made-in-U.K. products sold under a local name would open doc throughout Europe. President Howa S. Stern says "1992 gives us an impetu to set up a European infrastructure. focuses us on getting it done now rath than two years from now."

One CEO says he won't manufacture in Europe unless he faces 'absolute gate-slamming tariffs'

Larger players need slightly mo complex middle-of-the-road strategi Take Mentor Graphics Corp., of Bev ton, Ore., a $300 million-a-year maker computer systems that depends on E rope for 25% of its sales. To prepare : what he sees as a major 1992 shakeo Chief Executive Thomas H. Bruggere emphasizing research and developme in Europe and is even opening a tw way video link between British and U. research centers. Further, Mentor h established wholly owned subsidiaries six countries for sales, training, and se vice. Some software writing and har ware assembly has started in Holland

Likewise, Nordson Corp., a maker state-of-the-art industrial equipment Westlake, Ohio, is trying to defend European position without making a m jor manufacturing investment. W: about a third of its $250 million in sa in Europe, the company owns subsidi ies in eight European countries that c tribute and test its U.S.-made produ for such customers as BMW and Ur ever. But CEO William P. Madar not interested in manufacturing the unless he sees "absolute gate-slammi tariffs."

TRADE IMPACT. Europe 1992 means th all U.S. exporters will have to make cr ical decisions in 1988 and 1989. In som cases, niche players with winning stra gies in Europe will reap better sa growth than companies that depend ju on U.S. sales. But mistakes will be co ly: The small guys who invest too hea ly in Europe could find their manag ments stretched and their profi squeezed.

More broadly, the choices U.S. expo ers make will have a major impact the balance of trade with Europe. A f 11% of the 5,000 companies surveyed Joseph W. Duncan, chief economist f Dun & Bradstreet Corp., plan to st exporting within a year, many to E rope. If these and small exporters ha to set up shop in Europe to hang or their markets, the U.S. export boo could be hurt. "But to the extent th they stay home, that could make o exports even stronger," says Dunca That would augur well for the U.S. ab ity to wipe out the trade deficit w Europe. If that happens, the little gu will be the heroes.

By William J. Holstein in New York, a Maria Mallory in Cleveland, Resa W. Ki in South Windsor, Conn., Alice Cuneo San Francisco, and bureau reports

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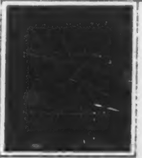
Special Report

FINANCE

THE MONEYMEN CAN'T WAIT FOR THE STARTING GUN

Banks, brokers, and insurers are already merging and doing deals to reap 1992's full benefits



It's the promise of a lifetime. If goods and services are no longer subject to trade barriers, neither is money. Without controls on currency flows, German insurance companies could write policies for French drivers and homeowners, Americans could sell mutual funds from the Irish Sea to the Aegean, and before long, marks, francs, and pounds would give way to one money. There would even be a Euro-style Federal Reserve.

That's the ideal. In reality, deregulating Europe's money is probably the toughest hurdle of all. Yet many changes will occur, and banks, investment houses, and insurance companies are racing to position themselves for the new Financial Europe.

BONANZA. In the past 18 months, some 400 banks and finance firms across Europe have merged, taken stakes in one another, or cooked up joint marketing ventures to sell stocks, mutual funds, insurance, and other financial instruments. These alliances are both helping strengthen the institutions at home and giving many a leg up in becoming global rivals to the behemoths of Japan, the U.S., and Switzerland, who are firing up their own European campaigns. Says Alan W. Morgan of McKinsey & Co.: "This is the opportunity for each country's markets to equalize."

As the EC frees up capital flows, the already bustling markets of Paris, Frankfurt, and Madrid likely will gain even more vigor, in time taking some luster away from London's $600 billion Eurobond market. But the biggest winners may be consumers. They will be able to shop more freely than ever for the best deal on savings accounts, credit cards, loans, stocks, and insurance. For the financial-services industry, which faces the prospect of freely selling to a market nearly twice the size of Japan's, "the potential is enormous," says Michael A. Butt, chairman of British insurer Eagle Star Holdings PLC.

To reach that potential, "companies are all jockeying for position to control channels of distribution," says David Baggaley, finance director of Britain's Abbey Life Group, which wants to merge with five units of Lloyds Bank PLC to create an insurance and real estate giant. Not to be outdone, Britain's Barclays PLC plans to sell mortgages, insurance, and money management services across Europe. London's Midla Bank PLC is negotiating to take a 4 stake in Euromobiliare, a leading Mil investment bank.

Europe thus may be heading towa the era of truly Euro-wide bankin Back in 1986, for example, Deutsc Bank Chief Executive Alfred Her hausen bought Bank of America's 1 branch Italian network for $603 millio launching what's shaping up to be move into retail banking across much the Continent. With $166 billion in asse behind him, Herrhausen has also beef up investment banking and moved in management consulting. He now is e pected to begin offering insurance, to

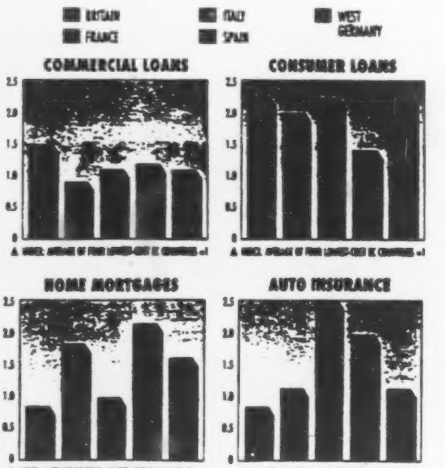
Others are equally ambitious. Amst dam-Rotterdam Bank and Genera Bank of Belgium, which plan to mer by 1991, already have jointly set up fi "Eurodesks" to drum up new corpora

(11)

business. In July, Banque Nationale de Paris, with $183 billion in assets, purchased Chemical Bank's British home-mortgage subsidiary. It's now shopping for other acquisitions or joint ventures. Indeed, with powerful new financial groups rapidly emerging, many smaller players are likely to disappear as independent entities. Italy, for instance, has "hundreds if not thousands of tiny banks," frets a top official at Banca Commerciale Italiana. "Very few are going to survive 1992."

EXPLOSIVE. Financial Europe is also giving some outsiders the jitters. The EC's Council of Ministers is considering restricting the activities of some foreign banks if their home countries don't grant Europeans privileges similar to those the foreigners would enjoy in Europe. This would not affect foreigners already in the EC. But it could keep out additional banks from Japan—the EC's apparent main target—and the U.S.

Unlike European countries, Japan prevents banks from underwriting securities. Moreover, Europeans have been allowed to carve out only a minuscule share of bank loans in Japan, against an estimated 10% share for the Japanese in Europe. The U.S. is vulnerable, too, because it keeps banks out of underwriting and bars unrestricted expansion across state lines. Canada, Australia, and Switzerland, whose banking laws also conflict with those of the EC, could likewise be on the hit list. "It's an explosive issue," says Kaj Areskoug, senior economist with Moody's Investors Service Inc. If Europe's moves toward reciprocity do indeed keep out foreigners, they "could lead to further protectionist pressures that would be harmful to all," warns Federal Reserve Board Governor H. Robert Heller.



WHO HAS THE EDGE IN FINANCIAL SERVICES

DATA: PRICE WATERHOUSE & CO

So far, such fears haven't deterred the world's largest investment banks. They are flocking to Europe to cash in on a growing takeover wave in the EC and in the U.S. by well-heeled European corporations. In Spain alone, Shearson Lehman Hutton Inc. is helping Banco Hispano Americano formulate an international strategy, while Salomon Brothers helped Banco de Bilbao put together a recent marriage with Banco de Viscaya aimed at international expansion. Says Salomon Brothers International Inc. Chairman Charles S. McVeigh III: "The most relevant thing today is the opportunity to help European industry restructure."

Many believe the EC has no choice but to move toward a single currency

STILL SQUABBLING. If Europe liberalizes its markets as fully as bankers expect, can a single EC currency be far behind? After all, 10 nations' currencies already are closely linked in the European Monetary System (EMS). More important, two key politicians, West German Chancellor Helmut Kohl and French President François Mitterrand, are actively promoting closer monetary coordination.

But after nearly a decade of progress, the EMS is still whipsawed by disagreement and national constraints. Mitterrand espouses a closer monetary union, but his Socialist government, suffering a trade deficit and labor unrest, is battling to save the franc from devaluation against the EMS' anchor, the West German mark. British Prime Minister Margaret Thatcher refuses to join the monetary system, although her government acts like a de facto member by adjusting interest rates whenever the pound threatens to become too cheap or expensive against other European currencies. Many Europeans believe that a single currency will eventually have to be adopted to make a truly common market. If that doesn't happen all the reforms will amount to "a damp little squib," scolds former West German Chancellor Helmut Schmidt.

VIABLE ALTERNATIVE. Most experts see integration coming about gradually. The EC might make a start by pooling foreign exchange reserves, under the management of a diverse board of governors similar to the U.S. Federal Reserve. Later on the board could establish common monetary goals for EC states to follow. Further use of the European currency unit, or ecu, a little-used artificial currency based on the mark, the pound, and seven other European moneys, may also be encouraged, gradually turning it into a parallel currency.

Some companies already are beginning to pay the ecu greater heed. The French industrial group St. Gobain handles transactions among some subsidiaries in ecus, while Compagnie Française des Pétroles and Italian auto maker Fiat plan to publish annual reports expressed in the currency. Fiat Chairman Giovanni Agnelli and Philips Chairman Cornelis van der Klugt are lobbying for greater use of the ecu in trade and other fields. Britain is issuing ecu-denominated government debt to foster a London-based ecu bond market. With such moves under way, says Bank of Italy Deputy Director Tommaso Padoa-Schioppa, "it takes less than is usually thought to get the substance of a monetary union."

Still, many obstacles stand in the way of full integration. The EC is a long way from unifying its tax structure, which could easily send massive amounts of funds and jobs flowing to the country offering the safest havens. And even the boldest firms may be deterred by the high cost of setting up Europe-wide distribution networks amid imposing cultural differences.

Somehow, though, that doesn't seem to bother many financial leaders. They may be moving at different speeds, in semidarkness, but most want to compete on a Europe-wide basis. How well financial deregulation plays out will tell a lot about the success of the rest of Europe's 1992 plans. If the EC's members are as eager to open their money markets up to the strains of competition as their actions suggest, the economic unification of Europe already may be well on its way to fruition.

By Blanca Riemer in Paris, with Richard A. Melcher in London, John Templeman in Bonn, William Glasgall in New York, and bureau reports

Science and Technology in Europe

89-178 SPR

CRS Report for Congress

The Europe 1992 Plan: Science and Technology Issues

Glenn J. McLoughlin, Coordinator
Analyst in Science and Technology
Science Policy Research Division

March 16, 1989

CRS

Congressional Research Service • The Library of Congress

THE EUROPE 1992 PLAN: SCIENCE AND TECHNOLOGY ISSUES

SUMMARY

The European Community (EC) 1992 Plan is a sweeping and ambitious plan to reduce, eliminate or harmonize barriers now existing between the twelve EC nations. The 1992 Plan has outlined 285 directives addressing these barriers. These barriers fall into three broad categories--material, technical and fiscal. Reduction, elimination or harmonization of these barriers by December 31, 1992, is intended to create a single deregulated market, the largest in the world.

The prospect of a unified European Community has raised questions about whether this will create a "Fortress Europe", particularly excluding the United States and Japan, or result in economies of scale, more efficient markets and a greater demand of outside goods and services. The effect of the 1992 Plan on current U.S.-EC science and technology issues is also open to debate. Generally, the 1992 Plan may have an impact on four basic areas: cooperative research, as outlined in current bilateral and multilateral agreements in science and basic research between EC nations and United States; non-tariff barriers, particularly standards, which may permit products to be sold in a single global market; EC research and development funding priorities, changes of which under the 1992 Plan might cause a need for a reevaluation of U.S. civilian and military R&D priorities; and in technology development and competitiveness, U.S. policies which encourage development of new products and technologies may be affected by changes in the larger trade practices.

Other individual science policies, technologies and industries may be affected by the 1992 Plan, in addition to specific issues in cooperation in basic research and science, standards, R&D funding priorities, and technology development and competitiveness of U.S. companies. U.S. information technology and telecommunications technologies, including High-Definition Television, will be affected by standards set in the EC, as well as changes in R&D funding priorities in the EC and United States and reevaluation of technology development and competitiveness policies. EC energy policies also might be affected by changes in any or all four of the overall science and technology issues. The defense technology base of the United States and EC differ, and changes in funding priorities for one may affect the policies of the other.

The 1992 Plan is not yet an accomplished fact; only half of the directives have been acted on to date and there are significant disagreements among the members on some important issues. Generalizations of what the 1992 Plan will--or will not--do, and when, may overlook that while the 1992 Plan might ultimately be deleterious in one area of U.S. science and technology policy, it also might create beneficial effects in another area.

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THE EUROPE 1992 PLAN: SCIENCE AND TECHNOLOGY ISSUES

BACKGROUND AND ANALYSIS

Overview

In 1985, a European Community (EC) Commission White Paper outlined 285 directives to eliminate or reduce barriers to promote the greater unification and coordination of the political, social, economic and technological policies of twelve western European nations. This blueprint--the so-called 1992 Plan[1]--categorized three major groups of barriers: material, technical and fiscal. The material barriers consist of controls of goods and people at EC borders. The technical barriers cover national standards, regulations and public-sector procurement. The fiscal barriers are primarily taxes which would be eliminated or harmonized among nations.[2] Elimination, reduction or harmonization of these barriers by December 31, 1992, is intended to create a single, deregulated market, the largest in the world. Notable progress has been made in implementation of the 1992 Plan, but several members remain in disagreement over some significant issues.

The idea of a single, unified Europe is not new; it was part of the creation of the EC in 1958, which called for a common market by 1972 (which was never fully met). However, it is still uncertain as to how "unified" Europe will become, and what will be the consequences for non-EC countries, specifically the United States and Japan. Many are debating whether by definition a unified Europe will be a "Fortress Europe", which will heighten the exclusion of other nations through pan-European barriers. Others argue that the 1992 Plan will create just the opposite effect: that it will result in greater economies of scale, more efficient markets and a greater demand of outside goods and services.[3]

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[1] The unification plan goes by several names: Europe 1992, Program 92, the 1992 Initiative, Pan-Europeanization, and others. For purposes of continuity, it will be referred to as the **1992 Plan** in this paper. For a general overview of the 1992 Plan and the EC, see U.S. Library of Congress. Congressional Research Service. The European Community's 1992 Plan: An Overview of the Proposed "Single" Market, by Glennon J. Harrison. CRS Report No. 88-623-E. Sept. 21, 1988. 33 p.; and U.S. Library of Congress. Congressional Research Service. The European Community: It's Structure and Development, by Martin E. Elling. CRS Report No. 88-1620F. Aug. 31, 1988. 63 p.

[2] Gosch, John. Who Will Win-Or Lose-In the Coming Unified Europe? Electronics. Nov. 1988. p. 81.

[3] Verity, William C. U.S. Business Needs to Prepare Now For Europe's Single Internal Market. Business America. Aug. 1, 1988. p. 2-3.

In U.S.-European science and technology issues, there is also uncertainty over the impact of the 1992 Plan. Generally, the 1992 Plan may have an effect on four basic areas:

Cooperative Research

Current multilateral and bilateral agreements between the United States and EC in basic research and science generally have been quite smooth and effective, reflecting the long-standing close relationship between the respective scientific communities. It is unlikely that the 1992 Plan will have a primary effect on these existing agreements, since there already is significant free movement of people and ideas both among the EC nations and with the United States. A by-product of the 1992 Plan might be more cooperative basic research among U.S. firms located in Europe and their EC counterparts; it may also lead to pressures for individual countries to look to others in Europe for collaboration, at the expense of collaboration outside of Europe.

Non-Tariff Barriers

These barriers, such as quotas, "buy-local" laws, customs and others may also affect the free flow of goods and services between the United States and Europe. A controversial non-tariff barrier which will be directly affected by the 1992 Plan is technical standards. Currently the U.S. Trade Representative acts on behalf of U.S. companies trying to sell goods in Europe, negotiating with each country on a case-by-case basis. Compatible and harmonized technical standards in Europe--outlined in the directives as part of the 1992 Plan--may be the linchpin which allows a variety of U.S. industries (especially in information systems and telecommunications) a uniform market to sell their goods and services. However, a more uniform regional barrier of standards arising out of the 1992 Plan might prevent U.S. industries from taking advantage of the "new Europe."

Research and Development Funding Priorities

The EC nations already are performing large-scale R&D in joint ventures. However, important differences exist between the United States and EC countries regarding the support of civilian vs. military spending and multi-year vs. single year budget cycles in the public sector. U.S. policymakers will have a limited impact on how EC nations will set their funding priorities. However, if the outcome of the 1992 Plan causes a further re-ordering of EC R&D activities, the United States might need to reevaluate its own priorities in both civilian and military R&D as well.

Technology Development and Competitiveness

Technology transfer and development occurs on a government-to-government level, as well as between U.S. and EC firms and their subsidiaries. On a variety of levels the 1992 Plan may change the way products are exchanged and used in the European market, ranging from the person-to-person transfer of technology in commercial laboratories to mergers and acquisitions in the global market. A secondary or tertiary effect of the lowering or elimination of trade barriers may be a reevaluation by the U.S. Government of its current programs to assist U.S. companies to compete in the world marketplace. Ultimately, the reduction and elimination of trade barriers among EC nations will affect the ability of American companies to efficiently produce and effectively compete in EC markets after 1992.

Overall, standards are clearly identified as one area for greater EC harmonization after 1992. Reduction or elimination of trade barriers may have a significant effect on technology transfer and development. Other areas of science and technology policy may be affected, but in more indirect ways. Current trends in cooperative research and science or R&D funding priorities may be accentuated rather than redirected.

In addition to these specific science policies, technologies and industries, there are overarching European programs which will affect how the U.S. will respond to the 1992 Plan. In particular, the EUREKA program, which completes and extends pan-European programs in basic and precompetitive research into areas "closer to the marketing of technological products".[4] These and other programs may provide an existing framework for the ultimate objectives of the 1992 Plan.

It must be cautioned that the 1992 Plan is far from being a fait accompli; at the end of 1988, only half of the 285 directives were in place. As recently as September, 1988, Prime Minister Margaret Thatcher of the United Kingdom tacitly addressed the underlying philosophy of the 1992 Plan, rejecting the idea of a "European conglomerate."[5] In addition, while the ultimate effect of the 1992 Plan on one area of U.S. science and technology policy--such as information technology or standards--may be deleterious, its effect on another area--such as energy or multilateral scientific cooperation--may be positive and beneficial. Therefore, this paper raises some of the more salient points to be considered for these issues; a more definitive understanding of 1992 may not be possible until we are closer to that date.

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[4] Commission of the European Communities. The European Community of Research and Technology. Luxembourg, Office for Official Publications of the European Communities, 1987. p. 67.

[5] Sullivan, Scott. "Genghis Khan" in Belgium; Thatcher Challenges Europe's Vision of 1992. Newsweek, Oct.3, 1988. p. 34.

COOPERATION IN BASIC RESEARCH AND SCIENCE

The United States is deeply entwined in a complex web of bilateral and multilateral scientific and basic research arrangements with Europe. These arrangements range widely in formality from activities under treaties to "gentlemen's agreements" with specific countries and agencies. For example, the North Atlantic Treaty Organization has had a Science Program for 30 years in which the United States has played a key role.[6] It supports advanced research workshops, advanced studies institutes, conferences, collaborative research, individual visits and exchanges, and special programs. The U.S. also has a formal bilateral science and technology agreement with Italy, as well as less formal memoranda of understanding between the National Science Foundation and specific agencies, in such countries as France and the United Kingdom.[7] Typically, it is said that cooperation between the United States and European countries in basic research and science is quite smooth and effective, reflecting the long-standing close relationships between the scientific communities of each, as well as the relatively similar levels of development of science in Europe and the United States.

In December 1983, a European Community-United States Ministerial Meeting decided to create a "EC-U.S. High Technology Work Group." This group has met eleven times since its establishment, most recently in early December of 1988. The group is to concentrate on examining the current situation in high technology, its future development, and the environmental factors which affect it. It is also to bear in mind the possibilities for joint cooperation in the field of high technology. However, it also was agreed that specific trade problems should be dealt with in the appropriate fora. The December 1988 meeting addressed two main issues: comparable access to government-supported R&D activities (including a possible EC-U.S. bilateral science agreement), and biotechnology. Earlier meetings discussed such issues as high definition television, and the contributions of high technology in the services sectors.[8]

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[6] U.S. Congress. House. Committee on Science, Space and Technology. Science, Technology, and American Diplomacy 1988. Ninth Annual Report Submitted to the Congress by the President Pursuant to Section 503(b) of Title V of Public Law 95-426. Washington, U.S. Govt. Print. Off., 1988. p. 58.

[7] Personal communication with Robert B. Hardy, Deputy Director, Division of International Programs, National Science Foundation, Jan. 3, 1989.

[8] This paragraph is based on a report to the EC-US Ministerial Meeting of Dec. 9, 1988, on the work of the EC-US High Technology Group, and on a summary of the Dec. 8 meeting of the Working Group prepared by the U.S.

At first glance, it would appear that the 1992 Plan will not directly address U.S.-European relationships in science and basic research. There is already virtually free movement of people and ideas among the countries, and to the extent that scientific progress thrives on openness and free movement, the prospect of even more open relationships in the future bodes well for science. And, the primary concerns of the 1992 Plan are the reduction or removal of barriers to trade and movement of goods, services, people, and money. The various implementing directives will have little to do with basic research and science explicitly, although they address the applications of science and research results to economic and social purposes. However, to the extent that the 1992 Plan reflects a greater degree of pan-Europeanization it could lead to pressures on each country to look to others in Europe for collaboration in research, at the expense of current or potential collaboration with the United States or other non-EC nations.[9]

Currently, there is great enthusiasm for international cooperative research in Europe, both under the EUREKA Program and under a variety of EC cooperative research and technology programs. These programs all reflect some degree of cooperation among firms and governments in Europe, generally with only limited government funds and with a focus on pre-competitive as opposed to basic research. Some have suggested that in the face of "Europe 1992," the United States may find it in its own interests to seek to put its bilateral scientific relationships with individual European countries on a more formal basis, in order to hedge against pressures to shift the partners' resources toward more intra-European cooperation. One major question that might be addressed in negotiations around an EC-U.S. bilateral science agreement would be the degree to which symmetrical access--especially by private companies from the other countries--to government-sponsored R&D programs should or could be sought. Such an agreement would have to take account of existing bilateral agreements between the U.S. and individual countries.

Similarly, the changed face of European markets in response to economic integration may have some impact on the distribution of private industrial research spending among the several countries, including the United States.

Office of Science and Technology Policy.

[9] Another form of regional economic integration is the European Free Trade Association, primarily comprised of the other non-EC western European nations. This association, as well as other regional economic and trade associations, may also be affected by the 1992 Plan, particularly if the effect of 1992 is to harmonize or reduce EC barriers at the expense of entry into the region by other nations. In science and technology issues, such questions as how the EC-EFTA relationship will be affected by 1992; how U.S. access to EFTA science and technology through multilateral agreements will be affected, and how overall U.S.-EC-EFTA coordination will be affected may loom larger on the horizon in the next several years.

Presumably, firms will be able to locate both production and research in countries based more on economic advantage and less on political concerns. What is not clear is (1) how firms will actually respond to the new opportunities and challenges of both the 1992 Plan and other forces leading toward globalization of industry, and (2) whether changes in the location of R&D or production might have any effect on the receptivity of various countries to research cooperation with the United States. There is considerable discussion in the press of a trend by American firms to invest now in Europe. This trend could result in a greater proportion of the R&D of such firms being carried out there. At the same time, every affected nation is becoming increasingly aware of the potential of basic research to contribute relatively directly to economic and national security objectives, and the European powers might decide to limit international participation.

Congress may wish to explore with the National Science Foundation, the Office of Science and Technology Policy, the Office of Oceans, Environment, and Science in the Department of State, the Office of the U.S. Trade Representative, the Departments of Commerce and Defense, and other relevant agencies whether they are (1) monitoring the implications of the various EC directives--existing and forthcoming--for U.S. science and scientific relationships, (2) taking those implications into account when formulating international projects, programs, and policies, and (3) ensuring the continued access of U.S. scientists and researchers to European programs on a reciprocal basis with European access to American programs. In view of the new authorities allocated to the Undersecretary of Commerce for Technology, the Congress may also wish to encourage a visible role for this agency in future discussions with the EC on access to R&D and technology transfer, since these responsibilities have been given to the Undersecretary by P.L. 100-519. Congress may also wish to ask the relevant agencies to inform it on an ongoing basis of the discussions held within the High Technology Working Group; discussions which, for example, do not appear to be addressed in the "Title V" report.[10]

STANDARDS

Technological standards--whether a single voltage standard for common wall outlets or a standardized operating system so that computers can "talk" with each other--form the basis by which industrial goods are traded among nations. A common technological standard between nations can facilitate trade and technology transfer. Similarly, the lack of compatible standards among nations can effectively create trade barriers and block the transfer or sale of technology. Multilateral agreements which may open up new markets for certain industries still hinge on how well the product can be adapted, or standardized, in international markets.

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[10] Ibid.

In preparation for 1992 the European Community (EC) is planning to harmonize differing national standards, as well as testing and certification procedures, into a single EC-wide body of uniform standards and regulations. This will allow all products that comply with EC standards to freely circulate within the European Community. In addition to the concern that uniform EC standards could exclude or hinder the entry of U.S. products into the European market is the possibility that imported products from the EC may be more competitive in U.S. markets, due to the economies European companies will experience from harmonized standards. On the other hand, EC standardization could have a beneficial effect on some U.S. exporters, because a U.S. product that met the EC requirements in one Member state would then be free to be marketed throughout the EC.

Most of the EC standards are being developed by non-governmental European standardization bodies, such as the Committee for European Standardization (CEN) and the Committee for European Electrotechnical Standardization (CENELEC). A special effort is being made to quickly develop a body of technical European standards for high-technology goods such as advanced composite materials and telecommunication equipment. In addition, the EC supports a Community Bureau of References (CBR) programme intended to make the results, analyses and measurements in scientific research more uniform throughout the Community.

It is important for U.S. exporters to have input into the European standards development process. However, according to the National Institute of Standards and Technology (NIST), "at the present time, interested parties in the United States do not have the opportunity to review and comment on proposed EC standards and directives during the development phase, i.e., before they are published in final proposed form. This prevents the review and full consideration of U.S. inputs at a time when they might be persuasive."[11]

The role of the Federal Government in promoting U.S. interests in EC standardization activities is limited. The issue of standards is part of the Uruguay Round of the General Agreement on Tariffs and Trade (GATT). Under the auspices of the GATT Agreement on Technical Barriers to Trade (the Standards Code), U.S. Government representatives (primarily the U.S. Trade Representative) have conducted bilateral standards discussions with EC officials. However, the EC claims that the Standards Code does not oblige signatories to publish proposed EC standards when they are first notified to EC Member States and their industry associations.

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[11] U.S. Dept. of Commerce. National Bureau of Standards. A Summary of the New European Community Approach to Standards Development. NBSIR 88-3793-1, Aug. 1988. Washington, 1988. p. 4-5.

NIST, through its Office of Standards Code and Information, serves as an information source for industry on standardization developments overseas.[12] NIST runs programs to assist manufacturers and exporters obtain foreign trade-related technical standards and information on regulations and certification. NIST is also trying to urge exporters to become more involved and cognizant of European standards development. Congress may wish to monitor these NIST activities as they relate to Europe 1992 and determine whether additional or expanded programs are warranted.

INFORMATION TECHNOLOGY

Information technology is viewed as a vital component to the future economic competitiveness of all nations. It comprises an increasingly significant share of economic activity, both in terms of manufacturing and in support of the service industries. As a result, leadership in the development of information technology and increased market share are major goals of the EC's 1992 Plan.

The Council of Ministers of the EC established a framework program for research and development (R&D) covering 1987-1991. The program is designed to establish a strategy for science and technology development within the context of an internal European market; set priorities for funding; and encourage cooperative efforts between governments, industry, and universities. The largest segment of the framework program is aimed at developing a homogenous European market and an information and communications society through R&D in information technologies and telecommunications. The research programs are designed to provide the technology base upon which European industry can become competitive and capture a growing share of the world market.

The main objectives of the ESPRIT program (European strategic programme for research and development in information technologies) are: to contribute to providing the European information technology industry with the basic technologies to meet the competitive requirements of the 1990s; to promote European industrial cooperation in precompetitive R&D in information technologies; and to contribute to the development of international standards. Specific projects will focus on microelectronics and peripheral technologies, information processing systems, and information technology application technologies. The emphasis is on "precompetitive" research (between basic research and development of marketable products.)[13]

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[12] See Title IV of the U.S. Trade Agreements Act of 1979 (P.L. 96-39), which directs the Secretary of Commerce to establish a standards information center and a technical standards office for non-agricultural products.

There is discussion in the United States about whether comparable R&D initiatives focussing on strategic technologies and involving cooperative government-university-industry approaches need to be fostered by the U.S. Government. Concern exists that a Community-wide R&D effort might create new competition for U.S. firms that traditionally have held a leadership position in information technology. Among the questions policymakers are confronting are: Does the U.S. Government need to invest additional resources in information technology R&D? Do R&D programs need to be better coordinated within the government, as well as between government, industry, and academia? Should U.S. research efforts be focussed on "strategic" technologies vital to economic competitiveness? Will U.S. research efforts which are primarily defense-oriented be as effective in supporting economic development as EC research efforts that are designed to develop commercial products? If not, should additional resources be committed for civilian R&D initiatives?

TELECOMMUNICATIONS

Telecommunications networks provide the infrastructure for delivery of a growing array of services and the mechanism for efficient distributed production methods. The growth of a service economy and global marketing are dependent upon the development of increasingly sophisticated communications capabilities and the ability to interconnect internationally. For this reason, telecommunications is another key component of the 1992 Plan.

RACE (Research and development in advanced communications technology for Europe) is designed to ensure compatibility between the different telecommunications systems and services under development in Europe and to establish Community-wide integrated broadband communications, incorporating a wide variety of telecommunications equipment and services. A major goal of this program is to position the EC as a key player is the world telecommunications equipment and services market through the establishment of a strong, internal European market. The program will focus on developing the technology base for integrated broadband communications, performing precompetitive development of integrated broadband communications equipment and services, and formulating common protocols and standards.

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[13] Council Decision of 28 Sept. 1987 concerning the framework programme for Community activities in the field of research and technological development (1987-1991). Official Journal of the European Communities, no. L302/8-9.

The research program represents one element of broader goals for telecommunications in the European Community. The EC is attempting to harmonize the diverse telecommunications regulatory regime that currently exists among the member countries. While some countries (particularly the UK and France) have moved toward a more competitive telecommunications environment, other countries have maintained a strong government-controlled monopoly approach.

In mid-1987 the EC completed a Green Paper on telecommunications that outlined a framework for developing a harmonized Community telecommunications regulatory environment. A subsequent Action Program identified several areas where consensus appears to exist. These include: removal of restrictions on marketing terminal equipment subject to type approval; opening up value-added services to competition; separation of the regulatory and operational activities of the national telecommunications administrations; allowing telecommunications administrations to compete equally in providing enhanced services; setting of tariffs based on common principles and costs; and establishment of Community-wide standards in conjunction with international standards efforts.[14]

Despite general agreement on these goals, questions remain about the ability of the EC to overcome national approaches and establish a harmonized Community-based approach to telecommunications. Although it appears likely that implementation of all the goals of the Green Paper--even those on which consensus appears--may not be realized by 1992, indications are that significant movement in that direction is underway.

While the United States is encouraged by the move toward a more competitive European telecommunications marketplace and the lessening of the monopoly control of the telecommunications authorities, concern also exists about possible negative consequences. In particular, 1992 proposals affecting standards, procurement policies, market integration, and reciprocity may create difficulties for U.S. firms attempting to compete in the European market. A major objective of the 1992 Plan is harmonization of standards, testing, and certification of products, including telecommunications and information technologies. This would allow products certified in one country to be accepted Community-wide. U.S. manufacturers currently cannot participate in this standards-setting process raising concerns that a "European" standard will be established that essentially denies opportunities for non-European firms. Even if market entry were feasible, additional burdens imposed by product certification procedures might make outside firms non-competitive. Additionally, the EC has not indicated that it would be inclined to allow manufacturers self-testing and certification, or that authorization would be given for testing in non-EC laboratories. This raises questions about how the United States can more effectively influence European and international standards setting activities to assist U.S. industry in penetrating foreign markets. EC standards may be significantly higher than U.S. standards, which are based on "no harm to network" criteria for equipment.

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[14] Crawford, Morris H. EC '92: The Making of a Common Market in Telecommunications. Program on Information Resources Policy, Center for Information Policy Research, Harvard University. July 1988.

Public procurement in Europe has traditionally favored national firms and has been non-competitive. The EC hopes to ultimately open public procurement to Community-wide competition. However, participation by non-EC companies may continue to be substantially limited and possibly based upon reciprocal access by EC firms to foreign public procurement markets. Should non-EC firms continue to be ineligible for government procurement contracts a portion of the European market--particularly in such areas as telecommunications--will remain closed to U.S. firms.[15]

HIGH-DEFINITION TELEVISION

Because 1992 may encourage more European joint research and development projects in information systems and telecommunications technologies, it may also foster greater attention to specific near-term commercial products. Of particular interest to many industrial nations is high-definition television (HDTV). HDTV has great promise for consumer markets--it could provide television programming with some combination of wider screens, better color, more visual detail and improved stereophonic sound. It may have military and industrial applications too.[16] In addition, because advanced television receivers will resemble fast, powerful computers, HDTV may also have an effect on industries such as computers and semiconductors. This latter observation is the basis in the United States for significant opinion that HDTV offers both a window of opportunity for the United States to recover some of its lost consumer electronics manufacturing and a further threat to its computer and semiconductor industries.

Attention in the United States has focused on the Japanese effort to set a new world-wide technical standard for studio production, incompatible with all previous standards, and thereby gain a marketing advantage for consumer equipment derived from its studio standard.[17] The Federal Communications Commission, whose advisory committee's stated aim is preservation of the domestic television broadcast industry, has provisionally ruled out some of the broadcast standards options derived from the Japanese studio standard. On the other hand, the U.S. State Department is involved in a controversial commitment to support the Japanese-inspired ATSC[18] studio standard before the relevant international standards body, the Consultative Committee on International Radio (CCIR), of the International Telecommunications Union (ITU).

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[15] Harrison, Glennon J. The European Community's 1992 Plan: An Overview of the Proposed "Single Market." CRS Report No. 88-623 E. Sept. 21, 1988 p. 28-29.

[16] U.S. Library of Congress. Congressional Research Service. High-Definition Television (HDTV) In the United States--What Does An "Even Playing Field" Look Like (with Policy Options), by David Hack. May 6, 1988. CRS Report No. 88-365 SPR. p. 1.

[17] Ibid., p. 3.

The Europeans have shown a more coherent response to the perceived Japanese threat than the Americans; it stimulated them to organize themselves. The European broadcasting establishment had long appreciated the picture quality of the Japanese system, promulgated by Nippon Hoso Kyokai (NHK). However, the Europeans only became aware of NHK's strategic commercial objectives when the NHK/ATSC system was put forward in 1986 to the CCIR as the sole candidate for a world standard. Previously, in 1982, a consortium of European broadcasters had negotiated a digital television studio standard, known as 601 (the Japanese and ATSC standards are analog standards.) The 601 standard was endorsed by the CCIR. The European broadcasters intended this studio standard to be the cornerstone for the future development of their television into the 21st Century.[19] When the United States proposed a Japanese-inspired studio standard to the CCIR in 1986, European delegates were at first suspicious, then resolute in opposition. The European Broadcasting Union had developed a system they called MAC, standardized for direct satellite broadcasting (DBS). This system was designed to be highly compatible with the various current European transmission systems, as well as the 601 studio standard, thus allowing an evolutionary approach in phasing in new equipment for both broadcasters and consumers.[20]

European broadcasters realized at the 1986 CCIR meeting that instead of a steady progression towards digital television featuring compatibility with existing networks, the Japanese (with American assistance) were about to intrude another generation of analog television which offered the consumer something totally different at the expense of compatibility. The Europeans have speedily coordinated themselves, with broadcasters and consumer electronics companies hard at work on a defensive strategy. Their strategy involves a EUREKA research program to develop their 601/MAC ideas into an HDTV system to offer as an alternative world standard. The EC likely will continue to use broadcasting standards as a way to protect the European market against other HDTV technologies, notably the Japanese.[21]

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[18] Ibid., p. 3. (In the United States, a standards organization known as the Advanced Television Systems Committee (ATSC), whose membership includes foreign-owned and foreign-influenced organizations, has developed a studio standard based on the Japanese studio standard.)

[19] Watson-Brown, Adam. Towards the Triumph of the Matte Black Box. InterMedia. v. 16, no. 1, Jan. 1988. p. 21.

[20] Ibid., p. 21.

The 1992 Plan could foster greater cooperation among the European nations in creating a single MAC standard, and this could significantly disadvantage or discourage the Japanese and Americans from competing in the European market. Yet implementation of the 1992 Plan might also illustrate the continued lack of European consensus in reaching a single MAC standard. During the December 1988 meeting of the EC-U.S. High Technology Group in Brussels, a full day was devoted to HDTV. The discussion was focused on recent developments in Europe, the United States and Japan, and issues of international cooperation for development of HDTV. In the United States, it may redirect intense American interest in U.S.-Japanese issues towards greater interest in a U.S.-Japanese-European axis concerning technology transfer, development and competitiveness. Whatever the outcome, the Japanese initiative will still be a milestone. The European system may ultimately offer the compatibility and esthetic benefits too, as a result of the European response.

Congress may consider the following public policy options to encourage revival of a U.S. consumer electronics industry through the opportunity of HDTV: small matching grants or seed money for the commercial development of hardware and software components of "open architecture" video receivers/displays, such as those being developed by the military through the Defense Advanced Research Projects Agency (DARPA); funding of standards development through the National Institute of Standards and Technology (NIST), as well as specific research and development funding for HDTV technology under NISTs Advanced Technology Program; reevaluation of the U.S. policy promoted by the Department of State supporting the Japanese-inspired studio production standard of HDTV as a worldwide (CCIR/ITU) standard; a permanent research and development tax credit; and specific inclusion of HDTV technology in the National Cooperative Research Act (P.L. 98-462).

ENERGY

Energy use in Europe differs from the United States in some important aspects. Generally, the EC has a much higher dependence on energy imports, particularly oil, and they use a significantly higher percentage of their oil for electric power generation. Finally, energy intensity (energy per unit of GDP) is about 40 percent less in the EC than the U.S. due to higher energy costs.

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[21] Rozien, Joseph. Dubrovnik Impasse Puts High-Definition on Hold. IEEE Spectrum. Sept. 1986. p. 32-34; 35-37.

These characteristics are reflected in the 1995 energy goals of the EC.[22] The goals include enhanced energy security through reduced oil use, greater supply flexibility, removing trade barriers to develop greater market integration of energy supply, improving the energy infrastructure of the weaker economic regions within the EC.

The R&D program focuses on three areas.[23] The first is nuclear power where primary attention is being given to safety in reactor operation and design. The second is non-nuclear energy, with concentration on renewable energy resources, energy conservation and expanded use of solid fuels. The last is controlled fusion which is centered on the Joint European Torus project at Culham in England. The EC also is an equal partner with the U.S., Japan and the U.S.S.R. on the design of the International Thermonuclear Experimental Reactor.

The energy program of the EC has had a long history of integration, particularly in R&D, beginning with the first oil price shock in 1973. Economic integration in 1992, however, should bring additional benefits. The removal of trade barriers to the flow of energy supplies may lead to a more uniform pricing system and greater energy security. Energy prices show considerable variation among the EC members. The degree to which greater uniformity and security comes about depends on how effective the 1992 program will be in making energy taxes and regulation more uniform among the member states, and more fully integrating electric utility transmission systems. Settling differences on how the member countries view nuclear power and dealing with the environmental effects of burning coal are likely to be contentious issues in this connection. On the demand side, removal of trade barriers and the creation of uniform standards may improve access to energy efficient technology. If integration effectively deals with these issues, the benefits of a more stable, secure energy supply could significantly enhance the economic competitiveness of the EC.

Current R&D efforts are not likely to change much since there is already considerable collaboration among the EC states. In addition, the International Energy Agency has been promoting collaborative R&D among its member nations--which include the EC countries--since 1974. Since EC energy goals emphasize energy efficiency and nuclear reactor safety, a more concentrated R&D effort could increase the chances of a major European presence in energy demand and nuclear technology markets.

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[22] New Community Energy Policy Objectives for 1995. Energy in Europe, No. 6. Commission of the European Communities, Directorate-General for Energy. Luxembourg, Belgium, Dec. 1986. p. 10.

[23] Energy Research and Development in the European Community. Energy in Europe, No. 2. Commission of the European Communities, Directorate-General for Energy. Luxembourg, Belgium, Aug. 1985. p. 11.

A principal policy concern for the U.S. is whether the U.S. energy R&D program should be changed or expanded to meet any market challenges that may arise from products emerging from a larger EC R&D program. In particular, would an integrated EC develop a nuclear reactor that meets the conditions of inherent safety, standardized design and modularity that are likely to be required for resurgence of the nuclear option in the U.S.? A similar question exists about demand technology, particularly for industrial process such as would be required for development of advanced materials. Congress may also wish to explore the consequences of integration on the international fusion effort. Is it possible that the EC after 1992 may choose to develop a fusion reactor without outside help? Such a choice would affect the U.S. fusion program which is becoming increasingly international. A stronger EC energy research effort may call for the U.S. to try to expand collaborative research with the Europeans through the International Energy Agency, particularly on renewable energy and conservation. Also, a post-1992 EC may intensify European concerns about acid rain leading to the need for the U.S. to expand its clean coal program and search for ways to reduce SO_2 and NO_2 emissions.

OTHER TECHNOLOGIES

The 1992 Plan may also affect other European science policies, technologies and industries (and therefore how the United States might respond), including:

- Semiconductor technology. Several EC nations are supporting JESSI, a consortium of semiconductor chip manufacturers, which was created to challenge the Japanese lead and the U.S. consortium SEMATECH;

- Biotechnology. Currently the EC has a pan-European biomolecular engineering programme (bep) and a biomolecular action program (bap) to perform laboratory research and to train engineers in related fields (e.g., agriculture);

- Advanced Materials. The EURAM (European Research in Advanced Materials) programme is a cooperative research venture in ceramics, composites and high-temperature superconductivity;

- Industrial. The BRITE programme--Basic Research in Industrial Technology for Europe--is intended to coordinate research centers, universities and industry in "traditional" industrial sectors, such as automobiles, chemicals, textiles and construction; and

- Space. Nine of the 13 members of the European Space Agency (ESA) are also members of the EC. ESA coordinates a broad variety of space science and applications programs for Europe, and developed the European launch vehicle Ariane, which is now operated by a private company, Arianespace. Some suggest using ESA as a model of how to coordinate the objectives of several nations into a single policy.

DEFENSE TECHNOLOGY BASE

For most advanced industrial nations, the ability to draw upon a wide range of resources for their national security is an increasingly important issue. Nations must set priorities--including research and development (R&D) priorities--as part of an overall strategy to ensure the availability of technology, personnel and information for its defense needs. This availability of resources--the "defense technology base"--is crucial for modern warfare. In the United States, the primary goal of the defense technology base program is to "counter Soviet numerical manpower and weapons superiority through the development of superior technology and future weapons systems."[24]

The member nations of the EC also have individual technology base programs, and share with the United States a military commitment to the North Atlantic Treaty Organization (NATO). Yet important differences exist between how the United States establishes its priorities to improve its defense technology base and what are the EC priorities. These include a reduction of defense spending by EC countries, as the United States has increased its defense spending levels; an increase in the amount of funding for EC civilian R&D efforts, particularly in commercial, joint projects; the belief among EC policymakers and leaders that civilian research can perform "double duty" in meeting both civilian and defense needs (versus U.S. policies which separate these two priorities); and EC policies which tend to fund R&D projects--whether military or civilian--in multiyear cycles, while the United States funds R&D within annual budget cycles.

While defense technology policies are not an explicit part of the 1992 Plan, the continued emphasis by EC nations on a joint civilian/defense technology base raises a series of questions. Will 1992 foster greater cooperation in joint R&D projects for technologies which may serve a "double duty?" Can the EC have a more unified, less restricted joint civilian/defense technology base, and still serve the needs of European military security and economic growth? How will this affect EC nations' participation in NATO, including defense weapon technology contributions? Will U.S. suppliers of defense technology for Europe be affected? How will the elimination of border controls affect the multilateral export control system? Will U.S. exporters be able to take advantage of an EC-wide export control zone?

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[24] U.S. Library of Congress. Congressional Research Service. Managing Defense Department Technology Base Programs, by Michael E. Davey. Apr. 21, 1988. CRS Report No. 88-310 SPR. p. 1.

The role of the United States affecting how EC nations will set R&D priorities may be restricted. However, Congress may wish to reassess certain policy considerations, including: R&D funding priorities, particularly the balance between civilian and defense R&D funding; whether multi-year funding cycles should be considered for U.S. R&D projects; whether export controls of scientific information and technology need to be reevaluated; and whether other means of restricting U.S. technology transfer, such as trade policy, will have an impact on how our European allies structure their defense technology base after 1992.

ISSUES IN COMPETITIVENESS

Concern over the ability of American companies to compete in the global marketplace has resulted in, among other things, several laws which are intended to promote research and technology development leading to private sector commercialization of products, processes, and services. The context within which these actions were taken stemmed primarily from competition with Japanese and other Pacific Rim companies. The prospect of the 1992 Plan may change the parameters under which current Federal programs and policies for technological advancement and industrial competitiveness operate. In anticipating issues--problems and opportunities--it may be possible to moderate some of the potential negative effects of this action on U.S. industry.

Aspects of the 1992 Plan which directly affect the availability of the European market to U.S. goods are, of course, pertinent to the competitiveness of American companies (e.g., protectionist measures, preferential government procurement). There are, in addition, several factors of the 1992 Plan which might increase the ability of European firms to compete in the global marketplace and therefore may have possible adverse consequences for U.S. industry. EC action taken in pursuit of the goals of 1992 should, among other things: (1) augment existing cooperative activities between firms by providing new funds and new talent; (2) supplement on-going government-industry cooperation and government assistance to industry; (3) increase mergers, acquisitions, and cooperative ventures by companies across borders; and (4) encourage cooperative ventures between European firms and American companies which want to establish a presence in the EC.

These results could be significant. One of the primary factors in the ability of foreign firms to compete with U.S. industry is their government's support for technology development activities. In numerous cases, governments in these countries actively promote commercial technology advance and application as a component of economic growth strategies. They foster industry-government cooperation and encourage collaboration between industries, companies, and/or technically-trained personnel, while allowing competition to stimulate development for the commercial marketplace. This is in contrast to the United States where technological considerations are not well integrated into economic policy decisions; where responsibility for technology development, if present, is diffused across agencies; and where cooperation generally has been limited to research.

Recent legislation has moved the U.S. Government toward increased support for cooperative R&D leading to commercialization in the private sector. It is expected that such activities extend the potential for the most effective and efficient use of resources. This is occurring, however, at a time when on-going cooperative efforts in Europe will be augmented and expanded by the 1992 Plan. For example, funding is provided for sectors in trouble, as evidenced by JESSI, the European semiconductor consortium. The EC sponsors programs in science and technology including joint research and cooperative R&D projects (e.g., EUREKA) and coordinates national efforts to avoid duplication. The British are known for their expertise in basic research; the Germans for their product development, the Italians for their product design. If national boundaries do actually "disappear", will the expanded cooperation between countries and companies result in products and processes which meet international market needs to a greater extent than U.S. goods and services?

The results of these cooperative activities, which oftentimes include direct government financial assistance, will be available in the marketplace along with many U.S. products and processes developed without such support. To illustrate, the Airbus, built by a consortium of European firms, now competes with airplanes developed and produced by individual U.S. manufacturers. The expanded opportunities for cooperation in Europe raise several issues which Congress might wish to explore. (1) What might be expected to be the effects on American companies which compete with firms that have government support (direct or indirect)? (2) Are cooperative R&D activities effective? (3) Will this necessitate a change in current Federal programs and policies in light of the nature of the competition, and if so, how might this be accomplished? (4) Are there viable legislative options?

The mergers and acquisition of existing European firms brought about by the 1992 Plan are expected to result in greater competition for American companies, particularly in manufacturing. These couplings often result in large conglomerates; many U.S. manufacturers are small companies. Will any "cross border" companies formed under the 1992 Plan cause additional competitive problems for U.S. manufacturers? What might this mean to smaller, specialized U.S. manufacturing companies? In addition, American manufacturers tend to be particularly vulnerable due to competition from Japan and the other Pacific Rim countries, where improved production processes and quality control make their goods more competitive. This situation may be exacerbated if the 1992 Plan is implemented. Legislative options Congress might consider to enhance technology development in domestic manufacturing a include reviewing: antitrust laws as they pertain to cooperative manufacturing; a permanent tax credit to cover both research and technology development activities; and programs to facilitate the development and use of process technology.

Another area which may be affected by the 1992 Plan is that of technology transfer. Although it is acknowledged that information and technology can not be contained within domestic borders for any length of time, lead time to develop a product or process and to build a market is crucial. However, the environment created by 1992 may accelerate the dissemination process, potentially to the detriment of American firms. Person-to-person interaction is the most effective means to transfer technology, knowledge, and skills. If U.S. based companies find that it is necessary to set up subsidiaries in Europe, this interaction is intensified. It remains to be determined whether or not the flow of technology resulting from U.S. private, and federally-financed, R&D to competing European firms will increase and what potential effects might be expected.

There are also on-going cooperative ventures between American and European companies which facilitate technology transfer. For example, GE sold its consumer electronics division to the French firm Thompson in exchange for its medical devices business. The two organizations agreed to establish a third company to conduct cooperative R&D program carried out at the David Sarnoff Laboratory. This company will eventually belong solely to Thompson (although the facilities will be donated to Stanford Research Institute). The expertise that the French company will acquire as a result may be magnified if Thompson then transfers technology and information to other EC firms. What might the expansion of cooperative ventures within the EC mean to technology transfer between American firms and their counter parts abroad? What will be the effect of foreign investment by EC companies in U.S. high-technology firms? What might be the effect of this on the ability of companies to protect technology developed domestically through patents and licensing?

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APPENDIX I

Community Bureau of References (BCR):

The purpose of BCR is to develop certified standard reference materials for the European community and to explore and solve problems related to applied metrology. Its parent organization is the European Community Commission, one of five organization with the EC. Member nations are those countries belonging the EC (see below).

European Committee for Standardization (CEN):

CEN was founded in 1961 as the European Standards Coordinating Committee. Its purpose is to promote European standardization in order to facilitate the exchange of goods and services among members. CEN produces European Standards and Harmonization Documents in all areas except electric and electronic goods. Members are: Austria, Belgium, Denmark, Finland, France, Greece, Ireland, Italy, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, the United Kingdom, and West Germany.

European Committee for Electrotechnical Standardization (CENELEC):

CENELEC was founded in 1973 by a merger of the European Committee for the Coordination of Electrotechnical Standards of EEC Member Countries (CENELECOM) and the European Electrical Standards Coordinating Committee. Its purpose is to harmonize the national electrotechnical standards of member countries and to remove trade barriers resulting from differing certification systems. Member nations are: Austria, Belgium, Denmark, Finland, France, Ireland, Italy, Luxembourg, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, the United Kingdom and West Germany.

European Community (EC):

Formed in 1957 by the Treaty of Rome as the European Economic Community (EEC), its current members are: Belgium, Denmark, France, Greece, Ireland, Italy, Luxembourg, the Netherlands, the United Kingdom and West Germany (Portugal and Spain were admitted into the EC in 1986). The EC was created to encourage economic integration, which is generally defined as a process to abolish discrimination between economic units belonging to different national states through harmonized economic policies. The 1992 Plan would go beyond the current economic integration of the EC by creating a true common market in which all non-tariff barriers and other impediments to commerce are eliminated.

European Free Trade Association (EFTA):

After the EC was created, EFTA was formed in 1960 at the Stockholm Convention to include those countries not part of the EC. Current membership is made up of Austria, Finland, Iceland, Norway, Sweden and Switzerland. A free trade association is an entity which eliminates tariffs among the members of the free trade association, but each member may maintain its own external tariffs against non-trade association nations.

European Space Agency (ESA):

ESA was formed in 1975 by the merger of the European Scientific Research Organization and the European Launcher Development Organization. It has thirteen members: Austria, Belgium, Denmark, France, Ireland, Italy, the Netherlands, Norway, Spain, Sweden, Switzerland, the United Kingdom and West Germany. A major ESA activity has been the development of an independent launch capability using a launch vehicle called Ariane.

General Agreement on Tariffs and Trade (GATT):

Signed in 1947 as an interim agreement, the GATT is now a formal multilateral agreement aimed at expanding and liberalizing world trade. The GATT Rounds are cycles of multilateral trade negotiations, the most recent being the "Uruguay Round", started in 1986 in Punta del Este, Uruguay, and currently being continued in Geneva, Switzerland. By the time the Uruguay Round was initiated, about 90 countries had signed GATT agreements, including the major industrial Western European, North American, South American, and East Asian nations. Several Eastern European nations also have participated in the GATT negotiations.

International Telecommunications Union (ITU):

The ITU was formed in 1947 from an existing organization of European countries concerned about communications services and policies. Now an international organization which is a specialized agency affiliated with the United Nations, it is responsible for coordinating international telecommunications policies and technologies. It has 168 members, including the United States and the EC nations, and its headquarters are in Geneva.

International Telegraph and Telephone Consultative Committee (CCITT):

A permanent organ of the ITU where member nations and recognized operating agents formulate recommendations concerning technical, operational and tariff aspects of international telegraph and telephone telecommunications.

(A second organization within the ITU is the International Radio Consultative Committee (CCIR), which addresses radio transmission policies, services and standards).

North Atlantic Treaty Organization (NATO):

Formed in 1949 by the major Western allies from World War II, NATO is the primary military alliance for western Europe. Its members are: Belgium, Canada, Denmark, France, Greece, Iceland, Italy, Luxembourg, The Netherlands, Norway, Portugal, Turkey, the United Kingdom, the United States and West Germany.

Organization for Economic Cooperation and Development (OECD):

The OECD was formed in 1961 in Paris as a consultative organization whose decisions are not binding on individual members. The OECD initially focused on economic and trade issues, but has since expanded its scope of interest to include science policy, the environment, social problems, informatics and natural resources. The members of the OECD include Austria, Belgium, Canada, Denmark, Finland, France, Greece, Iceland, Ireland, Italy, Japan, Luxembourg, The Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, Turkey, the United Kingdom, the United States and West Germany.

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Europe 1992 plan may change face of R&D

Americans, their eyes still on the technological threat from Japan, are only beginning to wake up to the revolutionary economic goal the European Community has set for itself for Dec. 31, 1992—the complete dropping of trade barriers among its member countries. It won't happen with a bang, but the goal is there. The 12 EC countries are halfway through changing some 285 individual laws to establish that single deregulated market.

The impact of 1992 on scientific and technological relations between the U.S. and Western Europe is still pretty vague. So, to help clarify foresight, the Congressional Research Service has just issued a staff report on what might be expected and what Congress should be asking as Europe integrates more fully. The report was prepared for the House Science, Space & Technology Committee under a group coordinated by Glenn J. McLoughlin of CRS's science policy research division.

As the McLoughlin group sees things, four areas will be affected most: the bilateral and multilateral cooperative arrangements between the U.S. and the European countries; nontariff barriers relating mainly to technological standards between countries; changes that are already occurring in Europe's R&D funding priorities; and U.S.-European competitiveness.

For cooperative research relationships, the overarching challenge to the U.S. involves dealing with essentially two Europes. The EC is an organism still in evolution. It is a government in many senses, with its own parliament, budget, regulatory authority, and diplomatic corps. A few days ago, for example, it committed its member countries to totally ban chlorofluorocarbons by the end of the century. It deals with practically all issues that require a common European position.

But the EC lacks two essential denoters of nationhood: its own currency and defense forces. The EC is a fixture in Europe, but so are the cultures and governments of France, England, Italy, and the rest of the member states. A "United States of Europe" will likely be some hybrid between what Europe is now and what the U.S. is today.

In any case, technological Europe probably will get more tied together and so the U.S. will have to decide which R&D arrangements with individual countries should be reduced, and which pan-European initiatives should be pursued. Under discussion currently is a broad science and technology agreement between the U.S. and Europe along the "symmetrical" lines of the one completed last year with Japan and the U.S.

France's Eureka program illustrates the complexities. Eureka's aim is to develop high-technology research programs through cooperation among the European countries. The EC participates, but the program remains French. On the other hand, the EC sponsors its Esprit program on the information sciences and has France as a member. Just how the U.S. will simplify what appears to be increasing organizational complexity remains to be worked out.

The report says that "The U.S. may find it in its own interests to seek to put its bilateral scientific relationships with individual European countries on a more formal basis, in order to hedge against pressures to shift the partners' resources toward more intra-European cooperation." But such maneuvering would signal U.S. opposition to a unified Europe and in many quarters wouldn't go down well.

The only current U.S.-EC science and technology activity relevant to 1992 is the High-Technology Working Group. Established in 1983, the group meets about twice a year and discusses, in general, problems and interactions between the two governments in high technology. The CRS report says the group last met in December and discussed high-definition television and contributions of high technology in the services sector. The group also is exploring the possibilities of a U.S.-EC bilateral science agreement.

Technological standards issues have always been controversial between countries because the opening and closing of markets hinge on them. Currently, the European countries are working hard to develop uniform standards in the information and telecommunications technologies, which represent multibillion-dollar markets. The U.S., however, is being excluded from participation in the standards-setting process and this raises concerns.

"A 'European' standard will be established that essentially denies opportunities for non-European firms," the report states. "Even market entry were feasible, ad tional burdens imposed by produ certification procedures might ma outside firms noncompetitive."

Implicitly, the sense emerging r peatedly from the report is that increasing, accelerating competitio between the U.S. and Europe i technology after technology. Th includes energy—the U.S. fears th the Europeans will develop a vanced nuclear reactors that compete better than U.S. designs on th world market. It includes high definition television and the well publicized race for multibillion dollar markets among the three industrial powers—U.S., Europe, an Japan. Biotechnology is an obviou area. Advanced materials is another. All three powers have single out such technologies for development. What gets shared? Wha doesn't? What, in fact, constitute "symmetry," that new concept i the global balance of technology?

Some of the problems come together in the report's section labele "competitiveness." What 1992 definitely will do is increase the climate for more and more joint ventures, mergers, and other interactive activities between corporations a well as more interaction between industry and government. In the U.S. the government is much less involved in commercial technological development than are the governments in the EC and Japan. If 1992 expands joint activities, the report asks, Will the U.S. fall behind Europe in innovation?

What the 1992 phenomenon underscores at the very least is the accelerating internationalization of science and technology as it is propelled by transborder finance and economics. Whereas in the past the U.S. carried on a paternal pattern of technical exchanges between itself and other countries, the driving force now is intense commercial relationships between countries where boundaries increasingly blur. Economics and thus technology are now driving science. Science and scientists are now commodities to be bought, borrowed, and sold as never before for their technological potential.

Wil Lepkowski

COMMISSION OF THE EUROPEANCOMMUNITIES

FIRST REPORT ON THE STATE OF SCIENCE AND TECHNOLOGY IN EUROPE

FOREWORD

After years of uncertainty and even-hostility towards new technology we are witnessing a change in public attitudes in Europe today: the need for scientific progress finds a greater acceptance again, and the success of European science is contributing to a new self-confidence. We no longer respond to the American and Japanese challenge in a defensive way.

This development was undoubtedly necessary because of the fact that technology has become a decisive element in world competitiveness. It is obvious that the scientific and technological potential of an economy largely determines its capacity to shape its own destiny. Only by developing this potential further can the European Community maintain its autonomy and an ability to succeed by its own efforts.

In spite of considerable successes, Europe still has a significant gap to fill in a number of high technology sectors. These are precisely the sectors which will determine our competitiveness in the decades to come: information technology, bio-sciences, new materials.

If Europe does not succeed in reducing its technological dependence in these fields over the next few years, the Community's internal market will also remain fragmented. A strong Technology Community is an indispensable element in our strategy for 1992, particularly because of its link with the liberalisation of public procurement.

This is where the present report should help to show the way. First of all, it is intended as an assessment of European science and technology to date. But it also identifies our technological needs for the future, as well as opening up a discussion on the best means of carrying them out.

There is no reason for the European Community to be reticent either in terms of science and technology or in any other field. There is nothing to fear in comparing our merits with those of our partners and competitors in the world market. The Community actually seems to be at a political and economic stage which should allow it to give technology the role which it ought to have today as we approach the threshold of a new century.

Karl-Heinz NARJES
Vice-President of the
Commission of the European Communities

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FIRST REPORT ON THE STATE OF SCIENCE AND TECHNOLOGY IN EUROPE

HIGHLIGHTS

1. This report is a first response to the request of the European Parliament for regular reviews by the Commission of the state of science and technology in Europe.

It draws on wide-ranging sources of information and assessment, notably: the Parliament itself, the science and technology administrations in the member states, the committees specifically established to advise the Commission on research requirements, the views of the independent evaluation panels on Community programmes, systematic monitoring of the scientific and technical press and scientific meetings, as well as ongoing work in other international organisations.

The Commission intends to update the report during 1989. Thereafter it should be published at two-yearly intervals.

2. The main aim of the report is to provide a factual basis for further reflection, both inside and outside the Community institutions, on Europe's needs in science and technology and how best they can be satisfied. It does not, however, attempt to identify at what level or in which framework at national or at transnational level action in specific fields could most beneficially be taken.

3. The tentative picture emerging from this first report can be summarised as follows:

(i) A good deal has already been done to improve the European situation by increased efforts in spending on research and development and in improving industrial performance through innovation. But the efforts are still unbalanced and fragmented. Three Member States (Germany, France and the United Kingdom) account for three-quarters of total spending on R and D in the Community; and regional variations are acute. Cooperative transnational actions (Community programmes, EUREKA, COST, ESA, CERN etc) account for only a small percentage of the total research effort;

(ii) European efforts are in case well below those of our major competitors (the USA and Japan) who are both spending more and also taking action to remedy their own weaknesses. Europe's position is also threatened by the new efforts of emerging science and technology powers (the NICs in particular);

(iii) Europe faces three main challenges:

- to increase its capacity to develop and pursue, where necessary, its own technological and economic options;
- to strengthen its international competitiveness, especially in those fields which will take on increasing importance in the future;
- to meet the social need for improved quality of life.

(iv) Europe has the resources to meet these challenges. It is rich in scientific talent and organisational ability. And in its present economic situation it can afford to invest more in R&D. The question is how to get the best out of these resources and in which areas to focus the effort.

(v) Getting the best out of European efforts entails addressing a series of issues: ensuring that science and technology are understood and accepted at all levels of European society; overcoming imbalance and fragmentation by better coordination and by ensuring an adequate basis for technological progress in the less-favoured countries and regions; encouraging the spread of technology skills throughout society; attracting more private sector finance and facilitating the diffusion of technology throughout industry; encouraging the links between industry and universities; as well as exploiting the scope for international collaboration in those areas where there are evident mutual benefits.

(vi) As far as research areas are concerned, the report highlights five areas of major relevance to the European economy:

- information technology and telecommunications - a particular research effort is needed to improve the situation of the European semiconductor industry.
- new materials and technologies for use in manufacturing industry - superconducting materials are particularly promising.
- aeronautics, where Europe faces a particular competitive challenge.
- biology and biotechnology which offer the prospect of major transformations in industry and agriculture as well as in the medical field. Specific efforts, however, are needed on basic plant biology, gene-mapping, neurobiology and biotechnology applications.
- energy, where Europe remains highly dependent on outside sources of supply - fusion is important for the longer-term and carefully targetted research on new and renewables and energy saving technologies in the shorter-term.

In terms of the quality of life there are major researcn needs in the fields of environment, health research and industrial , road and nuclear safety. In environment some of the research requirements have a global dimension. Europe has the capacity as well as the need to make a major contribution to the study of Global Climate change.

Underpinning these efforts in specific fields Europe must sustain and develop its capacity in basic research to provide the seedcorn for new technological openings.

4. There follow summaries of each chapter of the report.

I: SCIENCE AND TECHNOLOGY AND EUROPE'S ECONOMIC AND SOCIAL NEEDS

5. Despite substantial progress in recent years, Europe remains weak in a number of the science-based sectors which are growing rapidly world-wide. This specific weakness reflects a **technological dependence** in key areas. Electronic components is a particularly important case.

The more traditional sectors of manufacturing industry continue to account for higher shares of GDP than in the USA and Japan. Some of them have made real progress in modernising through the application of new technologies. Textiles is one example. Others, such as the paper and board processing industry, or parts of the machine-tool industry have been less successful. Even those that have radically improved their position through automation and innovation (eg. automobiles) face increasing competition. One successful company strategy in a number of industries has been to seek the capture of the top-end of the market through technology.

Major efforts continue to be needed to improve the technological position of European industry and to seize the opportunities offered by scientific and technological advance. Progress towards completion of the Internal Market will help to create the right framework conditions. But it needs to be accompanied by specific efforts in the RTD field.

6. Improvement in the **quality of life** - the environment, health, safety - are also increasingly important concerns throughout Europe. Developments in science and technology are opening up new opportunities for tackling these problems in an effective and economic manner.

7. Europe needs a **broadly-based scientific and technological capability** to respond to the twin needs of increased competitiveness and a better quality of life. This means being able to choose and to develop its own technological options where this seems appropriate. A fundamental research capability is particularly important. Fundamental research is increasingly recognised internationally as the provider of new openings and ideas and a key factor in conditioning the pattern of economic and social development longer-term.

8. The acquisition and maintenance of such a broadly-based scientific and technological capacity is, however, increasingly expensive: science is developing at an accelerating pace with ever shorter periods of time over which to depreciate investment in R&D. This underlines the importance of the most cost-effective solutions to the organisation of R&D, avoiding

fragmented efforts. It also means that the broadest possible market is needed for the commercialisation of the products of research and development.

II: EUROPEAN SCIENCE AND TECHNOLOGY IN A COMPARATIVE PERSPECTIVE

9. European efforts have to be set against the changing international environment. Our main competitors (the USA and Japan) have been making their own adjustments to changing needs while new players are becoming increasingly important or could be so over the coming years (the NICs, the Soviet Union, China).

10. European spending on R&D is still well below that of the USA in absolute terms and below the USA and Japan as a share of GDP. US spending in volume is 1.75 times that of the Member States of the European Community combined, and research intensity (R&D spending as a proportion of GDP) is only 1.9% in the Community compared with 2.8% in the USA and 2.6% in Japan. Germany alone has a research intensity (2.8%) comparable to Europe's competitors. Even when defence spending is excluded US expenditure remains significantly higher than the European average.

In both the USA and Japan business also invests and carries out more of the R&D than in Europe.

Both the USA and Japan have larger numbers of research scientists and engineers in their labour forces; the growth in Japan has been striking.

The United States

11. The high level of defence R&D in the USA, half of which is contracted out to industry, is a potent factor in mobilising resources. The precise level of spin-off to the civil sector from military R&D in general and from SDI in particular, is hard to assess. But there have been undoubted major benefits in the fields of materials, aircraft engineering, vehicle technology, computer technology and systems engineering. The shift during the 1980s of much military R&D towards development work tailored to the needs of more fundamental and applied research has, however, raised some concern in the USA about reduced industrial impact.

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12. This has coincided with worries about the **competitiveness** of **US industry** and US technological dependence, notably vis-à-vis Japan. The Reagan Administration has taken initiatives to encourage American industry to cooperate in the face of this challenge and to increase the transfer of knowledge from Federal programmes to industry. These have been combined with a more restrictive approach to the wider availability of the results of research.

13. A third concern in the USA is the prospect of a **shortfall of perhaps 500,000 scientists and engineers by 2010** because of demographic trends and the pattern of university enrolment. One issue is the encouragement of foreign students (especially those from the Pacific Basin) to stay on in the USA after graduation. At the post-doctoral level there are likely to be increased pressures to "poach" skilled R&D personnel from abroad, especially from Europe.

Japan

14. The importance of **basic research** continues to be recognised in the USA: it is the only sector of Federally-funded civil R&D to have increased in recent years. In Japan, where economic success has been founded essentially on the absorption and transformation of foreign technology, efforts are now under way to build up a capacity in basic research, reflecting a perception that this will be essential in opening up new technological options for Japan in the longer-term and enabling it to stay one step ahead. Already Japan has strengths in, for example biotechnology, new materials and neuro-computing.

This interest in basic research, and the need to respond to concern about the closed nature of the Japanese science and technology system, has led to new openings in international collaboration, including the Human Frontier Science Programme.

Emerging Science and Technology Powers

15. The most dynamic NICs are planning a substantial growth in R&D spending and strategies for the development of large cadre of highly qualified personnel, as they themselves face challenges from other industrialising countries. Korea in particular is making efforts in this direction. Other emerging science and technology powers include Taiwan, India, Brazil and Israel.

China is making particular efforts to improve its science and technology capability and major research programmes have been launched.

Developments in the Soviet Union, which has the largest scientific establishment in the world and significant achievements in, for example, aspects of space technology, mathematics and theoretical physics, will depend heavily on the success of the policy of restructuring (perestroika) and its impact on the deployment of scientific resources to the civil economy.

III: MOBILISING EUROPE'S RESOURCES

R&D spending (public and private)

16. Within Europe there are major **national** differences in levels of investment in R&D; in the relative importance of the public and private sectors; and in the distribution of resources among research sectors.

Three countries (Germany, UK and France) account together for over three-quarters of total public and private spending on R&D in the European Community. Germany has by far the highest research intensity and the highest number of researchers in its labour force. Industry also plays a bigger role in both the financing and execution of R&D in Germany than elsewhere. In the less favoured Member States the public sector is by far the predominant source of R&D finance.

17. **Regional** disparities are larger still. The gap in R&D intensity is of the order of 12:1 between the Member States themselves and much greater at a sub-national level. This technology gap between the developed and the less-favoured regions is much wider than the economic gap.

Government policies and public funding

18. In the majority of Member Sates public R&D budgets have grown during the 1980s, although there has been some recent tailing off.

19. **Defence** R&D is particularly important in the United Kingdom (around 50% of the total public finance) and France (34%), and to a lesser extent Germany (12.5%). Elsewhere the shares are much smaller and in some cases negligible. The wide differences in defence R&D make coordination of national policies on dual-use technologies particularly difficult.

20. Some countries give particular emphasis to the public funding of **basic research** (Germany, France and the Netherlands in particular). In others, public expenditure constraints, the rising cost of basic research, increased emphasis on measurable cost-effectiveness and urgent need to improve competitiveness have led to a new emphasis on **industrially-oriented** research.

European Cooperation and Coordination

21. Transfrontier cooperation in Europe, involving industry as well as universities, has increased significantly in the past few years. The experience has been overwhelmingly positive. The Community's own cost-sharing programmes have been overscribed, reflecting a widely felt need for collaboration, especially at a time when pressures on national budgets have been growing. The experience of EUREKA - 213 announced projects involving 800 organisations, two-thirds of them industrial - is further evidence of this thirst for a transnational approach.

22. The share of the total European research effort that is handled through these cooperative ventures remains, however, small. The total cost of projects supported through the Community's programmes is equivalent to about 4% of total estimated EC public and private spending on civil research. Even taking into account the other major European ventures -EUREKA, ESA, CERN, EMBL etc. - the vast bulk of research continues to be financed and carried out at national level, a large share of it through national budgets.

23. The need to identify precisely where excessive duplication and overlap occur among these national efforts is pressing. Efforts are being made within CREST to improve the information base and to "confront" national policies. In the light of further progress in this forum, the Commission intends to focus particular attention on duplication and overlap in its forthcoming reports on the state of science and technology.

IV: RESEARCH ISSUES FOR THE FUTURE

24. The research needs of Europe reflect the three challenges described in Chapter I:

- to improve international competitiveness, notably in the context of the completion of the Internal Market;
- to respond to the needs of society by improving the quality of life;
- to increase the Community's capacity to develop and pursue, where appropriate, its own technological options, drawing on the opportunities offered by a solid fundamental research capability.

The following is not an exhaustive list. It concentrates on areas where particular efforts are needed to complement or to supplement ongoing or planned activities by industry and by public bodies (national and transnational).

Improving Competitiveness

25. There are significant research needs in five ares: information technology and telecommunications, industrial materials and technologies, aerospace, biological sciences and energy.

26. The European **information technology** industries are in better shape than at the beginning of the 1980s. But the negative balance of trade in IT products is large (13.4 milliard US$ in 1986), reflecting dependence in the fields of electronic components in particular.

Research is needed to give Europe the capacity to master and develop the next generation of memory chips based on circuity for feature series below 0.5 micron. A significant cross-border collaborative project (JESSI) is currently under discussion among European manufacturers.

Progress is also needed in software and advanced information processing and in peripherals (flat panel displays and optical storage technologies) where Europe's position is weak.

More basic research is required on questions such as the security and reliability of computers, computer languages and machine-learning; as well as prenormative work to prepare the integration of IT systems designed for a wide range of services (intelligent banking and financial services etc.).

27. In **telecommunications** Europe's relatively favourable position could be threatened by continuing weakness in the electronic components sector, the spiralling costs of R&D and new technological and market challenges (such as the digitalisation of networks, developments in broadband networks).

Research is needed on a wide front, including better network management systems; specific electronic and opto-eletronic components; new materials and software tools.

28. A significant research effort will also be required in the development, coordination and integration of technologies for the **application** of IT and telecommunications, including language technologies.

29. **Manufacturing industry** currently provides 30% of Community GNP and employs 75% of the industrial work force of some 41 million. A general need is to ensure the diffusion and application of available new technologies by this sector. In parallel a major research effort continues to be necessary to open up new technological possibilities for European industry and to solve particularly pressing problems. Areas of particular interest include:

- techniques for quality control (which can cost up to 25% of company turnover)
- techniques for shaping, joining and assembly
- surface treatment to prevent corrosion (which can cost up to 4% of GNP)
- powder technology, which is a particularly large and high-value market
- other high-value materials, such as metal composites (already being developed for ceramic-reinforced light alloy pistons)

A concerted research effort on superconducting materials is particularly necessary. Large financial resources are being mobilised in the USA and Japan.

- norms and standards. Prenormative work is needed in a number of areas, including lasers.

30. In **aeronautics** the European industry has had major successes, capturing (1980-1986) 23% of the civil and 27% of the military world market. But sharply increasing competition can be expected over the next 10-15 years, not only from the USA but

also from Japan and industrialising countries such as Korea[*] and Brazil. The US remains in a particularly favourable position because of the large home market and the spin-off from military programmes.

The future commercial success of the European aeronautical industry will depend heavily on advanced technology. In order to prepare for the 1990s and beyond Europe the need is for broadly-based collaborative efforts focussed on aerodynamics and flight mechanisms, materials, acoustics, computation, airborne systems and equipment, propulsion integration and design and manufacturing technologies.

31. The future market for **biotechnology** products is difficult to quantify precisely; but worldwide the biological sciences are recognised to offer the prospect of major economic and social impacts (through environmentally "clean" transformations of agricultural and industrial productivity; progress in pharmaceuticals, chemistry and medical science; improved understanding of the brain, with its implications for computer design as well as its impact on psychology and psychiatry).

Four areas of research merit particular attention:

- **basic plant biology**. Without a better understanding of key structures and functions within plants it will not be possible to make significant advances in application technology;

- **gene-mapping** of complex organisms. For agriculture and industry the detailed mapping of the genes of important microbial plant and animal species is an essential complement to the work on basic plant biology. For medicine, a better understanding of the human genome is as necessary to the continuing process of medicine as knowledge of human anatomy is to its present state. This is laborious and expensive work. Major international efforts are underway. Europe has experience on which to build;

- **neurosciences**, where efforts are already under way to coordinate some national actions;

- **industrial and agro-industrial applications.** Particular research efforts will be needed by the pharmaceuticals industry to maintain its good competitive position, in the face of growing competition and the cost and time-scale needed for the development of new products. Research is also needed on improved food technologies and on nutrition itself.

32. The **energy** markets are currently slack, with plentiful supplies on world markets. But Europe remains heavily dependent on third countries for supplies, particularly of oil, which is still the largest single element in the Community energy balance. There is a continuing need to ensure adequately **diversified** energy supply and **efficient energy use** and to reduce as far as possible the impact of energy supply and use on the environment. Two lines of research remain of particular importance:

- **controlled nuclear fusion**, which offers the prospect in the next century of an environmentally acceptable, practically inexhaustible, geographically independent source of supply. Europe is already playing a leading role;

- research on selective **non-nuclear energy technologies** and technologies for improving energy use which offer the best prospect of exploitation on a wide scale.

Improving the Quality of Life

33. Science and technology have fundamental roles to play in devising rational and effective **environmental** policies. Continuing research efforts in Europe are needed under three interdependent headings:

- understanding the basic phenomena
- detection and interpretation of environmental changes
- prevention.

A scientific approach to understanding the complex interactions of the many complex sub-systems (the stratosphere, the atmosphere, soil, inland water, the sea) would have been unthinkable a few decades ago. But progress in basic mathematics, in analytical techniques and technologies (including remote sensing from space), together with the huge capacity to handle information through advanced computing, now makes this possible.

Some of the problems are particular to Europe in a regional sense and require European level efforts. Action is under way both through the Community programmes, COST as well as EUREKA projects. Good coordination among these projects is essential. The most complex issue of **global climate** change and the "greenhouse effect", however, is an issue with truly global dimensions. Europe has the capacity to make an important contribution to the International Geosphere-Biosphere Programme (Global Change).

34. In the field of **health**, Europe is faced with sharply rising health care costs (a world-wide phenomenon); a "greying" of its population, with the consequent increase in age-related diseases; and growing problems posed, in particular, by AIDs and cancer.

European research in the medical field suffers from particular fragmentation. This is an area where the value of concerted action across national frontiers has already been clearly demonstrated. The essential need is for more of the same in tackling the problems described above, as well as continuing research on medical technology.

35. In the field of industrial technologies and materials increasing attention will have to be given to **safety issues**. R&D has an important role to play in the development of common safety standards in particular for new technologies such as lasers.

The potential contribution of R&D to long-term **road-safety** through the development of the "intelligent" car and the infrastructure to support it, is also considerable. Cooperative efforts are already under way in Europe to address these issues (the DRIVE programme in the Community, and PROMETHEUS and other projects inside EUREKA). There is an obvious need for good coordination among all these projects to ensure optimal resource allocation.

36. Continuing attention will need to be paid also to work on the safety of **nuclear fission**. In addition to research on reactor safety, the safety of the fuel cycle, radioactive waste management and storage, the safety of dismantling nuclear plants at the end of their lives, a particular effort will be required to increase public confidence about **radiation protection**. This requires both research work itself and efforts by the scientific community to present the issues in a way which is accessible by the general public.

37. **Bioethics** are attracting growing attention world-wide. A particular effort is needed at Community level in particular because of the importance for the Internal Market of a harmonised regulatory environment. Ethical, societal and juridical considerations must accompany science and precede technological development.

Fundamental Research - the Essential Underpinning

38. Fundamental research is continuing to open up significant new opportunities through progress in mathematics, physics, chemistry and the earth sciences.

The theory of non-linear **mathematics** - pioneered in Europe - has pervasive applications, opening up prospects such as the all-optical computer, advanced modelling of climatic change or significant improvements in the functioning of the internal combustion engine.

In **physics** there are strong points in the European situation, but also some weaknesses: the efforts on laser science and technology, for example, are not on a par with those in the USA, despite some significant multinational efforts.
Europe occupies a good position both in **basic chemistry** and on the market for chemistry-based products. But there is a problem in recruiting a sufficient number of high quality students.

In **earth sciences** good European coordination is being assured by the European Science Foundation. In oceanography the USA is leading the field. Some aspects, such as the study of the coastal zone, the interface between the ocean and the atmosphere will be pursued through the Community's MAST programme and the EUREKA project EUROMAR.

Earth observation from **space** is of major potential significance for the earth sciences.

39. Within Europe there are already several multinational ventures for the common pursuit of Big Sciences (CERN, ESO, ESA, EMBL, ESF, etc.)[1]. There is growing collaboration amongst them, which must develop further. Increased collaboration with Community programmes is also desirable so as to maximise the industrial and commercial spin-offs. **Space research** is one area of particular importance.

40. There are also outstanding questions related to access to advanced middle-size research devices in Europe and the development of expensive scientific instrumentation. Given the cost of sophisticated facilities it is not feasible to imagine

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[1] CERN - European Centre for Nuclear Research
ESO - European Organisation for Astronomical Research in the Southern Hemisphere
ESA - European Space Agency
EMBL - European Molecular Biology Laboratory
ESF - European Science Foundation

that they can be available in every European country. Particular attention will be needed to provide a framework for cooperation among national teams.

V: KEY ISSUES FOR SCIENCE AND TECHNOLOGY POLICY IN EUROPE

41. Alongside the research needs themselves there are some broader policy questions of particular importance:

(i) the balance of effort between fundamental and applied research across Europe

One theme of this report is that a sound capacity in fundamental research is essential to Europe in its pursuit of technological and economic independence. This is an area where public authorities have a particularly important role. But in the funding and execution of basic research industry too has evident self-interest. In the USA much of this research is funded by industry.

(ii) the links between industry and the universities

These have been growing world-wide, with industry driven increasingly to tap scientific knowledge and universities driven by financial constraints. The trend is a desirable one, with two caveats: namely, that it should not jeopardise the pursuit of fundamental research in universities and that restrictions on the dissemination of research results should be minimised.

(iii) broadening and deepening the technology culture

The most successful economies in recent years have been those that have sought actively to develop on a broad base the human skills required both to research, to develop, to apply and to use technology. Japan is the best example. Europe as a whole is in a weaker position. There is shortage firstly, of skilled manpower trained to use the new technologies; while the output of research scientists and engineers to develop and apply the technologies is insufficient in many countries. An added difficulty is that the brightest and the best in Europe are often attracted across the Atlantic. Particular attention will be needed to ways of increasing the supply of skills and to provide an environment in Europe that is attractive to highly qualified scientists. This means removing the barriers to mobility of research workers between European countries.

(iv) **Public acceptability of science and technology**

Public concern about new technologies is often based on fear of the unknown. It is important both for democracy and for the pursuit of scientific knowledge that popular understanding of the issues should be improved. This will help to ensure that informed choices are made and a sound regulatory environment established. The information effort in many European countries is still inadequate.

(v) **Encouraging the private sector to invest more**

Industrial investment in R&D is still too low in many European countries. The venture capital markets are insufficiently developed in many countries and they are essentially national. Action is needed at national and at transnational level to improve the access to finance for innovation.

(vi) **The Diffusion of Technology**

As well as opening up new frontiers through research and development, Europe needs to exploit more rapidly the technologies that are already coming on the market or are about to do so. Here Japan in particular has a head-start. Some Member States (in particular Denmark) have made considerable efforts to promote a wide diffusion of technology. Others less so. Community-level action has a helpful role to play (notably the SPRINT programme). But more could be done to spread information about available technologies and the results of research and development.

(vii) **Policy Coordination and (viii) Cohesion**

Particular efforts are needed to improve the coordination of science and technology policies in Europe. At the same time steps must be taken to improve the RDT fabric in the less-favoured regions so as to enable them to achieve a level of excellence comparable to that of the more developed. This cannot be done without the provision of infrastructure and trained personnel. Regional and social policy instruments could be appropriately used to this end.

(ix) Cooperation with Third Countries

Science and technology are increasingly international commodities and further internationalisation is inevitable. The issue is how best to organise cooperation in such a way that it can be a "positive-sum" game in which everybody benefits. The approaches must depend on the situation of individual countries or regions.

The European Community has a particular interest in close science and technology links with other EFTA countries where good relations are already established through COST, bilateral agreements as well as EUREKA.

There is scope for improved cooperation with the **USA**. It would also be appropriate to take advantage of **Japanese** openings to examine the scope for mutually beneficial cooperative ventures, especially those involving expensive, long lead-time research.

As far as **developing countries** are concerned Europe has a role to play in tackling the specific problems of medicine, agriculture, energy and the environment which they face. The wider consequences for the LDCs of scientific advances in materials and biotechnology are also of significance and will need consideration in Europe as well as at an international level.

Further reflection is needed on the potential scope for RTD cooperation with the Soviet Union and Eastern Europe, given the new developments in relations across the European continent; and also on the appropriate form for scientific cooperation with the NICs.

(x) Avoiding technological protectionism

The longer-term benefits of RTD cooperation at an international level can only be fully realised if the transfer of knowledge and technology is facilitated. But the "industrialisation" of research and the growing importance of science to trade flows has increased the pressure to restrict flows of information in order to preserve competitive edge. Policy developments in the USA in this respect will need to be carefully monitored.

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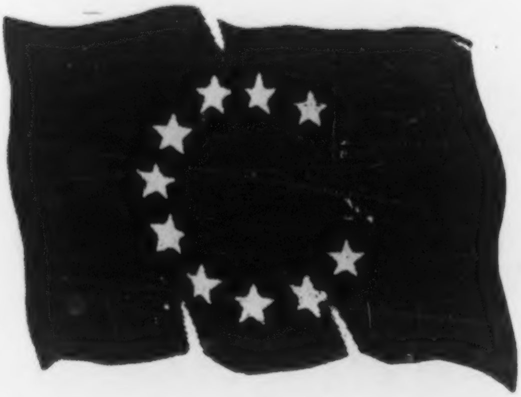
EUROPEAN COMMUNITY RESEARCH PROGRAMMES



FRAMEWORK PROGRAMME
1987-1991

INVENTORY
OF
SPECIFIC PROGRAMMES
WITHIN THE
FRAMEWORK PROGRAMME FOR COMMUNITY ACTIVITIES IN THE FIELD OF RESEARCH AND TECHNOLOGICAL DEVELOPMENT
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PREFACE

This inventory provides a short introductory summary of the specific R&D programmes within the Framework Programme for Community activities in the field of research and development 1987-1991. It includes existing programmes as well as those which the Commission has proposed to the Council, but not the activities of the Joint Research Centre.

This is the status of programmes as at 16 January 1989.

QUALITY OF LIFE

MEDICAL AND HEALTH RESEARCH PROGRAMME DG XII: Anthony DICKENS (235.00.32)

Research and development coordination programme of the EEC in the field of medical and health research (1987-1991)

Council decision of 17th Nov. 1987 (87/551/EEC) - OJ L 334/1987 65 Mio ECU

This concerted action programme coordinates at a Community level research activities undertaken in programmes of Member States. The Community is responsible for the coordination while the research is financed by the participating Member States.

The programme concentrates on major health problems such as cancer, aids, age-related health problems, environment and life-style related health problems. It further includes medical technology development and health services research.

RADIATION PROTECTION PROGRAMME DG XII: Georg GERBER (235.40.45)

1. Research and training programme for the European Atomic Energy Community in the field of radiation protection (1985-1989)

   Council Decision of 12 March 1985 - OJ L 83/1985 (58 Mio ECU), revised by Council decision of 21 Dec. 1987 (88/29/Euratom) - OJ L 16/1988 providing an additional 10 Mio ECU for 1988-1989. Total 68 Mio ECU

   The objective of the shared-cost radiation protection programme 1985-198 is the efficient and cost-effective protection of man and his environment from ionizing radiation and radioactivity.

   The programme was revised in 1987 to include additional research associated with the radiological consequences of the Chernobyl accident and the preparedness for possible future accidents.

2. Proposed research and training programme for the European Atomic Energy Community in the field of Radiation protection (1990-1991)

   Proposal for Council Decision COM(88) 789 final 21.2 Mio ECU

   This will be an extension of the current radiation protection programme, and will deal with the following subject areas: human exposure to radiation and radioactivity, the consequences of radiation exposure to man (assessment, prevention and treatment), and the risks and management of radiation protection.

   The research will be carried out primarily by shared-cost contracts.

PREDICTIVE MEDICINE PROGRAMME DG XII: Anthony DICKENS (235.00.32)

Research and technological development programme in the field of predictive medicine (1989-1991)

Proposal for a Council decision COM(88)424 final 15 Mio ECU

The proposed programme aims at the use and improvement of new biotechnologies for risk-forecasting, early diagnosis, prevention, prognosis and treatment of some human diseases, and for better understanding of the mechanisms of heredity. It shall cover research on the improvement of advanced genetic technologies, the improvement of the human genetic map, and the setting up of an ordered clone library of human DNA. It will also include training.

The programme shall be implemented through cost-shared or concerted action contracts, training contracts and training grants.

ENVIRONMENT PROGRAMMES DG XII: Heinrich OTT (Environment) (235.11.82)
DG XII: Roberto FANTECHI (Climatology) (235.57.35)

1. R&D programmes in the field of the environment protection (1986-1990)

Council decision of 10th June 1986 (86/234/EEC) - OJ L 159/1986
75 Mio ECU

The environment programmes comprise the protection of the environment (55 Mio ECU), climatology and natural hazards (17 Mio ECU), and pilot projects on major technological hazards (3 Mio ECU). Work is carried out as shared-cost contract research, concerted actions, coordination and training activities.

The environment research programme covers health and ecological effects of pollutants; assessment of chemicals; air, water and soil quality; noise, ecosystem and waste research; and pollution reduction. The climatology and natural hazards programme concentrates on the physical basis of climate, climate sensitivity, climatic impacts, seismic risk evaluation and causes, mechanisms and impacts of climatological anomalies and extreme or abrupt events.

2. Research and technological development programmes in the field of the environment (1989-1992)

Proposal for a Council Decision COM(88) 632 final 115 Mio ECU

STEP (Science and Technology for Environmental Protection) 75 Mio ECU

STEP will comprise research into environment and human health, risks associated with chemicals, air and water quality, soil and ground water protection, ecosystems, protection of European cultrual heritage, environmental protection technologies, major technological hazards and fire safety.

EPOCH (European Programme on Climatology and Natural Hazards) 40 Mio ECU

EPOCH will comprise research into past climates and climate change, climate processes and models, climatic impacts and climate-related hazards, and seismic hazards.

Both programmes will be implemented through shared-cost contracts, coordination activities, education and training activities, studies and assessments.

INFORMATION AND COMMUNICATION MARKET

ESPRIT II PROGRAMME DG XII: Ian COLLISSON (236.20.67)

European strategic programme for research and development in information technologies (Dec 1987-Nov 1992)

Council decision of 11 April 1988 (88/279/EEC) - OJ L 118/1988 1600 Mio ECU

Adopted in 1984, ESPRIT, a cost-shared action programme, was conceived for a 10 year period with three main objectives: to help provide European IT industry with the technology base it needs to meet the competitive requirements of the 1990s, to promote European industrial cooperation in IT and to contribute to the development of internationally accepted standards.

For the second phase of ESPRIT (ESPRIT II) the sectors for support have been adapted to the rapid pace of technological development and consolidated into three sectors: Microelectronics and peripherals, Information Processing Systems and IT Application Technologies. New emphasis is being placed on strengthening European capabilities in such areas as Application Specific Integrated Circuits (ASICs), high performance parallel processing computers and new office workstations, while ESPRIT II also includes a new component, Basic Research Actions, designed to complement the main industrial programme.

RACE PROGRAMME DG XIII: Jürgen ROSENBAUM (235.92.35)

Community programme in the field of telecommunications technologies - research and development in advanced communications technologies in Europe (June 87-May 92)

Council decision of 14 Dec 1987 - OJ L 16/1988 550 Mio ECU

RACE, a cost-shared action programme, deals with the integrated broadband communications (IBC) of the future. It is designed to lay the foundations of the Community's communications infrastructure for the 1990's and into the 21st century, by combining the expertise of telecommunications researchers, manufacturers, administrations and broadcasting stations across European frontiers.

The programme covers IBC development and implementation strategies, IBC technologies and prenormative functional integration.

DELTA PROGRAMME DG XIII: Mike ROGERS (235.02.89)

Community action in the field of learning technologies - Development of European learning through technological advance exploratory action (June 1988 - May 1990)

Council decision of 29 June 1988 - OJ L206/1988 20 Mio ECU

DELTA will support as a shared-cost action the research and development required to enable the emerging technologies to be utilised for the benefit of learning. The devices and techniques to be addressed include: more powerful processors including image processing; larger and cheaper storage, with new techniques of data organisation; Direct Broadcasting by Satellite; the Integrated Services Digital Network (ISDN); artificial intelligence; access by near-natural language and, in the more distant future, switched broad-band communications and "fifth generation" systems with access by voice. Start of projects: March 1989.

DRIVE PROGRAMME DG XIII: Fotis KARAMITSOS (236.24.76)

Community programme in the field of information technology and telecommunications applied to road transport (June 1988-May 1981)
(Dedicated road infrastructure for vehicle safety in Europe)

Council decision of 29 June 1988 - OJ L206/1988 60 Mio ECU

DRIVE, a shared-cost action programme, is designed to create the conditions for an integrated road transport environment in the field of information technology and telecommunications applied to road transport. The programme includes RTI technologies, evaluation of strategic options and specifications, protocals and standardisation proposals. Start of projects: January 1989.

AIM PROGRAMME DG XIII: Niels ROSSING (235.53.83)

Council regulation on a Community action in the field of information technology and telecommunications applied to health care (Pilot Phase - 2 years)
(Advanced informatics in medicine in Europe)

Council Decision of 4 November 1988 - OJ L314/1988 20 Mio ECU

AIM shall cover as a shared-cost activity the application of information technology to key areas of bio-medical science and health care. The theme of AIM is to sustain quality growth in health care in the Community for the 1990's within economically acceptable limits by exploiting the potential of medical and bio-informatics (MBI). Call for proposals closes: 14 February 1989

MODERNISATION OF INDUSTRIAL SECTORS

RAW MATERIALS AND ADVANCED MATERIALS PROGRAMME

DGXII Matteo DONATO(235.39.55) Raw Materials
DGXII Joseph WURM (235.52.90) Advanced Materials

Research programme on raw materials and advanced materials (1986-1989)

Council decision of 10th June 1986 (86/235/EEC) - OJ L 159/1986 70 Mio ECU

This programme covers four sub-programmes: primary raw materials (minerals), secondary raw materials (recycling of non-ferrous metals and waste), wood as a renewable raw material (including cork), and advanced materials (EURAM), including alloys, ceramics and composites.

A new raw materials programme (1990-1993) is in preparation. The successor to EURAM programme is part of the Commission proposal for a BRITE/EURAM programme (1989-1992).

BRITE/EURAM PROGRAMME

DG XII:Willem van der EIJK (235.59.60) Production and Materials Technology
DG XII:Joseph WURM (235.52.90) Materials Research
DG XII:Herbert ALLGEIER (235.40.55) Aeronautical R&D

Research and technological development programme in the fields of industrial manufacturing technologies and advanced materials (1989-1992)

Proposal for a Council decision COM(88)385. See also COM(88) 393 final for aeronautics
499.5 Mio ECU

The proposed new programme builds on the experience and the achievements already emerging in the first BRITE and EURAM programmes and will cover cost-shared research projects concerning advanced materials technologies, design methodology and assurance for products and processes, application of manufacturing technologies and technologies for manufacturing processes. It will also carry out research aimed at the development of the European aeronautical technology base, including aerodynamics, acoustics, airborne systems and equipment and propulsion systems. The programme will include coordinated activities and feasibility awards aimed at assisting SMEs.

A separate research programme in aeronautics will be prepared to follow this pilot phase.

Z

BCR PROGRAMME DG XII: Hubert MARCHANDISE (235.50.14)

Research and development programme in the field of applied metrology and chemical analysis (1988-1992) (The Community Bureau of reference)

Council decision of 29 June 1988 - OJ L206/1988 59.2 Mio ECU

This is the programme of the "Community Bureau of Reference" and is intended to provide scientific support for the Community standardization policy, a key element in the efforts to unify the Community's internal market. The specific aim of the programme is closer agreement between the results of measurements and analyses within the Community.

The main programme topics receiving priority are: foodstuff and agricultural analyses, environmental analyses, biomedical analyses, analyses of metals and applied metrology.

Projects involve several types of activity: inter-laboratory comparison, cooperative measurement programmes, improvements of measurements and analysis methods, improvement of high-precision instruments, etc. The major part of expenditure is committed through shared-cost contracts.

RAW MATERIALS AND RECYCLING PROGRAMME DG XII: Matteo DONATO (235.39.55)

Research and technological development programme in the fields of raw materials and recycling (1990-1992)

Proposal for a Council decision COM(88) 795 45 Mio ECU

This programme aims to help enhance the international competitive posititition of the Community's industries involved with raw materials and recycling. It will include primary raw materials, the recycling of non-ferrous and strategic metals, renewable raw materials (forestry and wood products), and the recycling of waste.

BIOLOGICAL RESOURCES

BIOTECHNOLOGY PROGRAMMES DG XII: Dreux de NETTANCOURT (235.40.44)

1. Research programme for the European Community in the field of biotechnology (1985-1989) Biotechnology Action Programme)

   Council decision of 12 March 1985 - OJ L83/1985 (55 Mio ECU) revised by Council decision of 29 June 1988 - OJ L206/1988 providing an additional 20 Mio ECU. Total 75 Mio ECU

   The essential objective of the biotechnology action programme (BAP) is to develop the Community's capacity to master and exploit the applications of modern biology to agriculture and industry. The programme includes activities of research, training and concertation in the key areas of biotechnology. It covers contextual measures for R&D in biotechnology (bio-informatics, collections of biotic materials), basic biotechnology (e.g. enzyme engineering, genetic engineering, technology of cells and tissues cultured in vitro) and concertation activities. The proposal for a revision increases the resources devoted to the programme without widening the range of activities in progress.

2. Research and technological development programme in the field of biotechnology (1990-1994), known as BRIDGE: Biotechnology Research for Innovation, Development and Growth in Europe. 100 Mio ECU

   Proposal for a Council decision COM(88)806

   BRIDGE will continue the work of BAP in strengthening the scientific base of Europe's biotechnology, and hence improve its international competitiveness.

   The programme will include research and training activities (90%) and concertation activities (10%). The research and training programme will include information infrastructures (culture collections, data processing), enabling technologies (protein design, molecular modelling, gene mapping, biotransformation, etc.), cellular biology and pre-normative research (e.g. safety assessments and evaluation of toxicity).

   Concertation will cover a range of monitoring, information and collaborative activities to provide and facilitate the effective application of biotechnology to the community's social and economic objectives.

ECLAIR PROGRAMME DG XII: Finn REXEN (236.31.64)

Multiannual programme for biotechnology-based agro-industrial research and technological development (1988-1993)
(European collaborative linkage of agriculture and industry through research)

Proposal for a Council decision COM(87)667 80 Mio ECU

The objective of the programme is to promote in Europe the useful application of recent developments in the life sciences and biotechnology. It will consist of the following sectors: production and evaluation trials of candidate species or organisms, industrial products and services and integrated approaches.

Implementation of the programme will be through cost-shared research and development actions, coordination activities and training/mobility grants.

FLAIR PROGRAMME DG XII: Finn REXEN (236.31.64)

Multiannual research and development programme in food science and technology (1989-1993)
(Food-linked agro-industrial research)

Proposal for a Council decision COM(88)351 final 25 Mio ECU

The proposed programme will focus on the interface between consumer, industry and research, concentrating on the downstream end of food science and technology and coordinating research and industry efforts with the consumer's demands and requirements. It will comprise three sections: measurement and enhancement of food quality; food hygiene, safety and toxicology aspects; nutrition and wholesome aspects. The programme will be implemented through cost-shared and concerted actions.

AGRICULTURAL RESEARCH PROGRAMME DG VI (Agric.): Philippe MOULART (235.24.18)

Research programme on agricultural competitiveness and the management of agricultural resources (1989-1993.

Proposal for proposal for a Council decision COM(88) 459 final 55 Mio ECU

The aim of this programme will be to help EC farmers to adapt to the new situation created by overproduction and the restrictive prices and markets policy, to improve farming conditions in regions that have been slow to develop, to encourage environmental protection and land conservation, to develop agricultural information services, and to improve the dissemination of research results.

It will be carried out by shared-cost contracts, high-priority pilot projects and coordination activities.

ENERGY

RADIOACTIVE WASTE PROGRAMME DG XII: Serge ORLOWSKI (235.40.63)

Research and development programme on the management and storage of radioactive waste (1985-1989)

Council decision of 12 March 1985 (85/199/Euratom) - OJ L 83/1985 62 Mio ECU

The programme is aimed at perfecting and demonstrating a system for managing the radioactive waste produced by the nuclear industry ensuring, at the various stages, the best possible protection of man and the environment.

The programme covers waste management studies and associated R&D actions and construction and/or operation of underground facilities open to Community joint activities. The work is carried out mainly under contract.

A new programme (1990-1994) is in preparation.

DECOMMISSIONING OF NUCLEAR INSTALLATIONS DG XII: Benno HUBER (235.40.84)

1. Research programme concerning the decommissioning of nuclear installations (1984-1988)

   Council decision of 31 January 1984 (84/60/Euratom) - OJ L 36/1984
   12.1 Mio ECU

   The aim of the programme is the joint development of a system of management of nuclear installations finally shut down and of the radioactive wastes produced in their dismantling which, at its various stages, will provide mankind and the environment with the best protection possible.

   The programme promotes research and development projects concerning seven different subjects, the identification of guiding principles and the testing of new techniques under real conditions within the framework of large-scale decommissioning operations undertaken in Member States.

2. Research programme on the decommissioning of nuclear installations (1989-1993)

- Proposal to the Council COM(88)415 31.5 Mio ECU

The proposed cost-shared programme succeeds the programme (1984-1988) and is composed of three sections with the same subjects as the current programme: research and development projects (Section A), guiding principles (Section B) and testing of new techniques in practise.

Section C has been strongly expanded in order to enable the Community to participate more substantially in selected pilot dismantling projects undertaken in various Member States.

TELEMAN PROGRAMME DG XII: Herman de NORDWALL (235.53.55)

Multi-annual research and training programme on remote handling in nuclear hazardous and disordered environments (1989-1993)

Proposed for a Commission decision COM(88)416 19 Mio ECU

The proposed TELEMAN programme is a five year cost-shared research programme covering remote handling in the nuclear industry, in hazardous and disordered environments.

TELEMAN's technical objective is to strengthen the scientific and engineering bases upon which the design of tele-operators for use throughout the nuclear industry rests. This will be done by providing new solutions to problems of manipulation, material transport and mobile surveillance in nuclear environments and by demonstrating their feasibility.

CONTROLLED THERMONUCLEAR FUSION DG XII: Charles MAISONNIER (235.73.15)

Multi-annual research and training programme in the field of controlled thermonuculear fusion (1988-1992)

Council decision of 25 July 1988 (88/448/Euratom) - OJ L222/1988
JET and General Programme 735 Mio ECU
Council decision of 14 October 1988 (88/522/Euratom) - OJ L286/1988
Joint Research Centre: Fusion technology and safety 60 Mio ECU

The Community Fusion Programme is a long-term cooperative project embracing all the work carried out in the Member States in the field of controlled thermonuclear fusion. It is designed to lead in due course to the joint construction of prototype reactors with a view to their industrial production and marketing.

The Programme is implemented by means of contracts of Associations between Euratom and the national organisations active in fusion, by the JET Joint Undertaking, and through a multilateral agreement concerning NET. There are also fusion technology activities within the Joint Research Centre. The fusion programme will be revised at the beginning of 1991.

JET = Joint European Torus
NET = Next European Torus

NON-NUCLEAR ENERGY PROGRAMMES

DG XII: Marcel TROUSSON	(235.39.78)	Coordination
DG XII: Ernst ROMBERG	(235.37.00)	Energy Sistems Analysis
DG XII: Wolfgang PALZ	(235.69.22)	Renewable Energies
DG XII: Pieter ZEGERS	(235.58.45)	Rational Use of Energy
DG XII: Giancarlo IMARISIO	(235.69.19)	Fossil Fuels
DG XII: Karel LOUWRIER	(235.69.62)	Geothermal Energy

1. Research and development programme in the field of non-nuclear energy (1985- 1988)

   Council decision of 12 March 1985 (85/198/EEC) - OJ 83/1985 175 Mio ECU

   The cost-shared action programme continues the development of alternative energy options and improves the economic viability so far achieved. It covers research on renewable energy sources such as solar energy, energy from biomass and wind and geothermal energy. It further covers rational use of energy like conservation, solid fuels, new energy vectors, hydrocarbon and energy systems analysis and modelling.
   The programme will be succeeded by the proposed JOULE programme (1989-1992).

2. Research and technological development programme in the field of energy - non nuclear energies and rational use of energy - (1989-1992), known as JOULE: (Joint opportunities for unconventional or long-term energy supply)

   Proposal for a Council decision COM(88)388 final/2 122 Mio ECU

   The JOULE programme will ensure continuity with the previous non-nuclear energy programme (1985-1988), but with an updated form and content so that it can pursue earlier promising developments and attain the current objectives.

   The four sub-programmes of JOULE will focus on models for energy and environment, rational use of energy, energy from fossil sources and renewable and geothermal energy. The programme will consist of activities carried out by means of shared-cost research and study contracts, coordination projects and awards of training and mobility grants.

SCIENCE AND TECHNOLOGY FOR DEVELOPMENT

DEVELOPMENT PROGRAMME DG XII: Jacques CALAZANS (236.20.81)

Research and development programme in the field of science and technology for development (1987-1991)

Council decision of 14 December 1987 (87/590/EEC) - OJ L 355/1987 80 Mio ECU

The programme, mainly implemented through cost-shared contracts, aims at promoting an increased scientific cooperation between the European Community and developing countries to their mutual benefit. It comprises two sub-programmes.

The tropical and sub-tropical agriculture sub-programme (55 Mio ECU) covers the improvement of agricultural products, conservation and better use of the environment, agricultural engineering and post-harvest technology and production systems. The second sub-programme (25 Mio ECU) concerns medicine, health and nutrition in tropical and subtropical areas.

MARINE RESOURCES

MAST PROGRAMME DG XII: Jean BOISSONNAS (235.67.87)

European research programme on marine science and technology (1989-1992)

Proposal for a Council Decision COM(88)587 50 Mio ECU

The main focus of the MAST programme will be on coastal and regional seas which does not exclude some limited research on the open ocean where particularly relevant.

The programme will cover basic and applied marine science (modelling, oceanography), coastal zone science and engineering, marine technology and supporting initiatives (in particular the need for better use of existing facilities, sharing of data and information, and for improved training).

It will be implemented both by cost-shared research and coordinated activities.

FISHERIES PROGRAMME DG XIV (Fisheries): Alexander ROPKE (235.74.33)

Community research and coordination programmes in the fisheries sector (1988-1992)

Council decision of 19 December 1987 (87/534/EEC) - OJ L 314/1987 30 Mio ECU

The research and coordination programmes cover the fields of fishery management, fishing methods, aquaculture and upgrading of fishery products.

EUROPEAN SCIENTIFIC AND TECHNICAL COOPERATION

SCIENCE PROGRAMME DG XII: Louis BELLEMIN (235.36.96)

A programme plan to stimulate the international cooperation and interchange needed by European research scientists (1988-1992)

Council decision of 29 June 1988 - OJ L206/1988 167 Mio ECU

This plan consists of a range of activities selected on the basis of their scientific and technical quality, which have as their aim the establishment of a network of scientific and technical cooperation and interchange at a European level. It aims to improve the efficacy of research in Member States and to help reduce the scientific and technical disparities between them. It covers all fields of the exact and natural sciences, such as mathematics, physics, chemistry, life sciences, earth and ocean sciences, scientific instrumentation and engineering sciences.

The programme is implemented by means of bursaries, research allocations, grants for high-level courses, contracts encouraging the twinning of laboratories and operations contracts.

SPES PROGRAMME DG XII: Louis BELLEMIN (235.36.96)

A European stimulation plan for economic science (1989-1992)

Proposal for a Council decision COM(88)98 final 6 Mio ECU

The programme will consist of a range of activities to establish a network of cooperation and interchange between economists of the highest professional quality at the European level. The programme shall be implemented through scholarships, research grants, grants for multinational networks or research projects and subsidies for organizing high level training courses and scientific meetings.

Possible research topics are issues related to the internal market of the Community, European integration economics, economic growth in Western Europe, systematic issues in the monetary areas and macroeconomic and fiscal policy coordination, trade policy, the role of Western Europe in the international division of labour and employment and social policy issues.

LARGE-SCALE SCIENTIFIC FACILITIES DG XII: Louis BELLEMIN (235.36.96)

Community support plan to facilitate access to large-scale scientific facilities of European interest (1988-1992)

Proposal for a Council decision COM(87)319 final 30 Mio ECU

The plan consists of a range of temporary financial support arrangements granted to scientific institutions in the Community having large-scale research and development facilities or installations which, in return for the Community contribution, agree to make these facilities or installations available to scientists and researchers working in universities, public research centres or industrial laboratories.

Researchers and scientists to whom facilities and installations have been made available will be able to benefit from research grants and funds provided for in the Science Plan. The Plan covers all fields of the exact and natural sciences, research and precompetitive technological development.

MONITOR PROGRAMME DG XII: Herbert ALLGEIER (235.40.55)

Community programme in the field of strategic analysis, forecasting and evaluation in matters of research and technology (1988-1992)

Proposal for a Council decision COM(88)386/2 final 22 Mio ECU

The purpose of this programme is to contribute to the identification of new directions and priorities in the common research and technological development policy and to establish more clearly the relationships between it and the other common policies and to the improvement of evaluation of R&D programmes. It comprises three activities: strategic and impact analyses (SAST); forecasting and assessment (FAST); and research and studies in support of the evaluation of R&D activities (SPEAR).

The SAST activities consist of carrying out impact studies (technological, industrial, socio-economic, environmental) and analyses "targeted" at a scientific field, technology or sector.
The FAST activities include the study of scientific and technological changes and their many interactions with economic and social changes.
The SPEAR activities concern the definition of practical and reliable procedures for the evaluation of R&D programmes and other methods of carrying out R&D. They also cover the means of support and management of research.

The financial contribution of the Community towards these activities could be up to 100% of necessary expenditures.

DOSES PROGRAMME STATISTICAL OFFICE (Lux): Daniel DESAY (Lux.4301-2854)

Multiannual programme for the research and development of statistical expert systems (1989-1992)

Proposal for a Council decision COM(88)410 4 Mio ECU

The programme aims at enhanced capacity to produce and use statistical information, employing advanced data processing techniques. The actions address the exploitation of advanced information technologies in the field of statistics, in particular the application of expert systems technology to the whole chain of statistical data processing.

The actions are oriented to develop knowledge and expert systems rules, which can constitute the base for the development of expert systems in the various domains of the statistics field.

The programme will consist of two parts: Part I comprises the organisation of coordinated projects and Part II comprises research and development projects jointly funded and regarded as meriting priority in the field of official statistics. It is (sub)divided into four parts.

DISSEMINATION AND UTILIZATION PROGRAMME DG XIII: Albert STRUB Lxbg.4301-2919

Programme for the dissemination and utlization of results from research in science and technology (mid 1988 - mid 1992), known as VALUE.

Proposal for a Council decision COM(88)260 38 Mio ECU

The purpose of the programme is to ease and accelerate the circulation of information related to RTD work and results in order to increase the efficiency of the RTD work itself and to stimulate the process of innovation and industrial exploitation in Europe by facilitating, through general measures, the utilization of results of Community RTD by all potential users and by improving the efficiency of distributed research and development activities throughout Europe.

The two sub-programmes cover the areas of dissemination and utilization of Community RTD results and computer communication networks.

All forms of appropriate Community actions are to be used, in particular subsidies, service and shared-cost contracts and studies.

EUROTRA PROGRAMME DG XIII: Sergei PERSCHKE (Lux.4301-3423)

Transition of the EUROTRA programme to the third phase and specific programme for the completion of a machine translation system of advanced design (1989-1990)

Proposal for two Council decisions COM(87)491 - additional 6.5 Mio ECU to 20.5 Mio ECU
Total 27 Mio ECU

EUROTRA is a cost-shared programme aiming at the creation of a machine translation system of advanced design, capable of dealing with all official languages of the Community.

The proposed Council decisions concern the transfer of the EUROTRA programme to its third phase (stabilization of the linguistic models and evaluation of results) and a specific programme for the completion of a machine translation system of advanced design. The objective of the specific programme (6.5 Mio ECU) is, on the one hand, the execution of the supplementary tasks required in the third phase of EUROTRA (inclusion of Spain and Portugal) and, on the other hand, the reinforcement of software development and preparation for industrial involvement.

Report

European futures in science and technology

FAST II at the mid-term

The FAST programme, launched by the European Communities in 1979, is aimed at developing and testing a tool for identifying long-term directions for R&D. The pursuit of these aims in FAST II (1984–87) represents a true application of futures research on a European scale. The main orientation is towards the social and individual changes that are being brought about by the application of the new technologies. This mid-term report of the FAST II programme, directed by Riccardo Petrella, gives an assessment of the extent of results obtained in fields as diverse as: uses generated by new information technologies; the deep change in the nature of service activities; and the evolution of agricultural techniques and food processing. The programme brings together researchers, national administrations and industries in a futures-oriented research programme: it should provide the basis for outlining concrete proposals for developing European Community strategies.

The changes underway, partly caused by scientific and technical progress, make it difficult to obtain a clear picture of what European societies could and should become in 15-20 years' time. Consequently, there is an ever-present need for European forecasting in science and technology to clarify and give a common purpose to Europe's long-term technical and socioeconomic development. This is all the more important today when Europe is suffering from the lack of any integrated view of national futures and when science and technology are confronted on a planetary scale with new industrial military and political challenges.

How then can the technological 'renaissance' of Europe be promoted?[1] How can we cope with the changes in employment brought about by the new technologies? On which actors can new policies be based, given the increasing worldwide dimensions of science technology and industrial structure implying also world-based strategies? How can we improve European living conditions (health, nutrition, environment, participation)? How can European science and technology also be harnessed for the benefit of the Third World countries which will account for 80% of the world's population in 15 years' time?[2]

Only by replying to these questions will the Community countries have any hope of benefitting to the full from

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technical change. But these questions are becoming increasingly difficult to answer. The frontiers of science are being pushed back every day (space, genetic engineering, artificial intelligence, etc) to the point where it seems likely to encroach on every area of human activity. Under these conditions, scientific progress is increasingly coming up against issues of a political and ethical nature (for example in the field of biotechnology) that have a bearing on the long-term objectives of our societies and to which it is not easy to find an answer.

This difficulty is compounded by the vital need to meet the industrial challenge that will become crucial in the very near future because of the deficit in our 'technological balance'. Because of the urgency and gravity of the immediate problems, longer term problems are all too often regarded as having no priority or even as an impediment to short-term action. Forecasting must tackle this 'cracked mirror' that reflects the image of a two-stage future. It is the role of forecasting to reconcile the different time horizons and to translate into options for the present the issues that emerge from a study of the numerous dimensions of the long term.

Lessons of FAST I

Societal analysis and forecasting of technological change may seem a circuitous way of identifying long-term R&D priorities, but it is unavoidable. This was the basis of the FAST approach;[3] its work, backed up by studies conducted by some 50 European centres,[4] showed that the Community R&D policy inspired by the crises of the 1970s did not sufficiently anticipate the turn-of-the-century problems. It was necessary to extend and change the emphasis of the R&D activities in the light of five major guidelines:[5]

- to sustain and stimulate the consolidation and renewal of the European industrial base around two poles: the 'agro–chemo–energy' complex and the 'space–electronics' complex;
- to contribute to the design a development of the infrastructur of the next 30 years for the ne services (in particular teleco munications);
- to accompany the transformation employment and to facilitate t establishment of new man-machine relationships;
- to inspire and stimulate the scien and technology needed for soluti of certain major problems of Thi World countries and the development of their indigenous scienti and technological potential; and
- to provide the community with t necessary and essential knowled to facilitate the joint mastery technological change.

The FAST approach also proved fruitf in practical terms—the results of th approach have given rise to new joi ventures. For example they have bee used to prepare a Community biotechnology policy; they have provided initial concepts for the ESPRIT programme; they have provoked a debate on the role of technological innovation in the phenomenon of 'bogged-down growth'. In a more limited area they have, for example, led to national programmes in the areas of chemical R&D and instrumentation technologies for the environment, etc.

FAST II (1984–1987)—a dual task

The main task[6] of FAST is still to analyse scientific and technical change in its many dimensions—economic, social and political—so as to identify new priorities for a common R&D policy and for long-term action in the Community.

In addition, FAST aims to strengthen the bases of European forecasting and forward thinking by exploiting the research on the long term undertaken in the Member States and encouraging the setting-up of *ad hoc* cooperation networks between researchers and potential users.

Work programme

Themes studied

The FAST I work had produced one fundamental result: it revealed an enormous potential for development, growth and employment in the sphere of new applications of the new technologies.[7]

The Commission therefore took the view that a forecasting approach by technological 'family' (what type of R&D for microelectronics, for biotechnology, for materials, etc) had to be supplemented bv an approach by field of application or by function: what type of R&D for service activities, for the food function, for the communication function, etc?

Current research under the FAST programme therefore focuses on five fields[8] vital to economic growth and social development:

- technology–work–employment relations (TWE programme);
- services and technological change (SERV programme);
- new strategic industrial system of communications (COM programme);
- future of the food system (ALIM programme); and
- integrated development of renewable natural resources (RES programme).

Alongside these five subprogrammes, some horizontal activities are also being undertaken to ensure that the results of the work are consistent and properly integrated.

Expected results

To consolidate the links between the work of FAST and activities in other Commission departments and to give the programme a more practical slant, three types of 'intermediate products' were defined in advance. These will use the results of the programme for precise objectives. They should be available early in 1986. They consist of the following:

Strategic dossiers. These will identify long-term issues and examine possible options for Community action. Eight strategic dossiers have been defined:

- man–machine relations;
- manufacturing sectors in turbulence;
- services and firms;
- services, infrastructures and regions;
- communications industry;
- function of communicating;
- future of the European food industry; and
- natural resources: tools for forecasting.

Exploratory dossiers. These will identify new lines of study, draw attention to new issues and perform a watchtower function. Nine exploratory dossiers are planned:

- transnational and local technologies;
- the self-employed;
- services of the future;
- the challenge of space;
- communication and development;
- food and health;
- forestry: the challenge of long-term management;
- the agro–chemo–energy complex;
- scenarios for Europe.

Proposals for Community initiatives. The aim is to propose practical projects to be implemented at Community level. Three proposals are planned:

- Community and services;
- management of natural resources in Europe; and
- human resources.

In addition, the programme includes the organization of three European conferences intended to take stock of the question and highlight the main features of European problems in the fields studied. The subjects will be:

- future of financial services;
- press and the new technologies: the challenge of a new knowledge; and
- biological diversity.

Resources

The programme has a total budget of 8.5 million ECU[9] for the period 1983–1987. These funds are used for:

- Staff costs for the FAST team of 12 made up of six researchers and six technical and administrative staff.
- Contributions of 50% to the financing of research under contracts concluded with outside bodies after a public call for proposals (the work already started totals 3.8 million ECU, 1.8 million of which is provided by FAST).[10]
- Research activities in *ad hoc* networks (for a total of about 1.5 million ECU).
- Operating expenditure (missions, ACPM meetings, expert meetings, publications, running costs).
- Costs associated with the secondment of scientific fellows to the FAST programme by the Member States to the equivalent of a maximum of 20 man-years.

Launching and execution

To carry out this programme, FAST has launched 37 research activities and set up a European system of cooperation.

Contract research

Of the 37 research projects, 23 are being carried out under contracts with 65 European teams (see Annex 3, list of contract teams by subprogramme).

These teams represent a very wide range of competence: they come from ten Community countries and in many cases have set up multinational associations in order to carry out FAST projects.

They are multidisciplinary and specialize in forecasting even though it is clear that in some fields (includ
renewable natural resources) the fo
casting approach is not hig
developed. They come from univers
(56%), public bodies (16%) or priv
organizations (28%).

As FAST is a shared-cost p
gramme, the contracts with resea
teams have to be 50% financed fr
other sources. Joint financing has b
obtained fairly easily, often thro
national public or semi-public bodi
which is clear evidence of the inte
that the Member States are showing
the work of FAST.[11]

The setting up of teams has
always gone smoothly, both for scienti
reasons (the difficulty and novelty of t
subjects covered by FAST), and
practical reasons. Thus six projects h
fallen behind schedule.

Network research

In some cases, more added value can b
obtained by circulating availab
knowledge than by producing fre
knowledge. This is particularly true i
three situations—the need for
extremely wide range of expertise, th
vital importance of national contex
and the need to compare differe
analyses on controversial subjec
Where one or more of these characte
istics are found, the network seems to b
the best tool to ensure that the researc
will be really productive.

FAST has so far set up three networ
research projects:

SERV 2: technical tools for the ne
services (wide range of expe
tise, importance of nation
contexts).

COM 8: consequences of a global ne
work on the autonomy an
relevance of the nation
dimension (multidisciplinary
field, controversial analyses).

TET 8: the technologies of light (wid
range of expertise).

The establishment of specific networks
for contract research activities has also

encouraged in five cases. Other orks will be set up in the months d. Already 90 institutes are directly ed in addition to the 65 teams ng under contract. Finally,[12] rous European researchers have ly participated in FAST activities. his new experiment with network rch nevertheless poses some difficulties (slow to get going, uncertain king method, cumbersome coation). At first sight these culties appear to be due to the dequate funds allocated for the ose—for good European coordina- it is necessary to pay the required

'10 + 1' network

his connects FAST to ten national nits designated for the purpose by the Member State governments to ensure tinuous and efficient interaction tween the work under the programme d similar activities undertaken by onal departments.

The '10 + 1' network is above all a mmunications tool. It performs this ction by means of:

- European meetings held every two months to take stock of the progress of the programme, to ensure European coverage of research activities and to avoid duplication of effort.
- 'National days'—national units organize in their own countries a FAST day bringing together researchers, industrialists and civil servants who are faced in their work with forecasting questions of the kind tackled by FAST or who are end users of the work. Such days have already been held in Ireland (5-6 July 1984) and in Belgium (7 February 1985).[13] Other days were planned in FR Germany, Denmark, Italy and the Netherlands before the end of 1985.

Scientific fellows

The Council of Ministers made provision for the Member States to second national experts to FAST. They are seconded to the programme by national bodies concerned for a limited period (12-24 months). They are then allotted a very precise task within the programme (generally they take responsibility for a 'product').

Six fellows (one Dane, one Dutchman, one Frenchman, two Italians and one Canadian) are already at work. Others (two Germans, two Belgians and one French) are expected to start in the near future.

TABLE 1. NATIONAL UNITS IN THE FAST '10 + 1' NETWORK

Belgium:	Services de Programmation de la Politque Scientifique
Denmark:	Reference Group (an *ad hoc* group coordinated by the Forkninssekretariatet)
ance:	Programme mobilisateur 'Technologi–Emploi–Travail'—Ministry for Research and Technology
Germany:	Kernforschungsanlage, Jülich
ece:	Unit in the Ministry for Research and Technology.
land:	Irish Secretariat for FAST (coordinated by the National Board for Science and Technology)
aly:	Istituto di Studi sulla Ricerca Scientifica del Consiglio Nazionale delle Ricerche
mbourg:	Not yet nominated
therlands:	Toegepast-Natuurwetenschappelijk Onderzoek (TNO)
UK:	Technical Change Centre

The fellows system is proving beneficial because in addition to their own expertise they help to extend the FAST networks through their personal contacts. At the same time it should be noted that there has been some difficulty with recruitment.

The Commission allocates approximately 0.6 million ECU to finance the participation of fellows. Annex 4 contains an overview of the implementation of the programme.

Research progress report—initial pointers

Given that the research is still in progress it will only be possible:

- To make some preliminary points on *tendencies, problems and perspectives* in each of the five areas under study, all of which will have to be checked in the light of work in progress and the final results.
- To sketch out an initial assessment of the FAST programme in the development of a European system of cooperation in scientific and technological forecasting.

Analysis of changes—some initial pointers

Relations between technology, work and employment. Prudence is required when *analysing the impact of new technologies on the volume of employment.* Technology is only one factor among others (demographic evolution, national and international economic context, public financing, the strategies of the actors involved, the relative economic strengths of competing countries and industries . . .). In addition, it is always difficult, both methodologically and through the lack of adequate data, to reconcile the results of global analyses (at the level of the national economy for instance) with specific case studies. In this context the FAST research on 'Macro-economics and Technology' has once more underlined the usefulness and limits of existing economic theories with their corresponding econometric models.

A number of interesting points, however, can be singled out:[14]

- The new technologies have still not reached the level of diffusion predicted at the beginning of the 1970s. Since then, the quantitative impact of new technologies on employment has not been as important as was anticipated. This situation should change in years to come to the extent that informatics also affect small and medium firms as well as liberal professions.
- Global studies tend to emphasise the positive effects of new technologies on the volume of employment even in the short term as a result of the secondary and indirect impact of technological change.
- On the the other hand, the majority of case studies point to a negative direct short-term effect on employment.
- Employment creation is more significant when new technologies are used in products rather than production processes and when they involve new uses rather than the improvement of existing uses.

As regards the *qualitative implications and consequences for work*, the principal aspect whch seems to emerge from the growing complexity and interaction between tools and technical systems is the transformation of man–machine relations and the need to identify the new scientific, technical, economic, organizational and ergonomic factors.[15]

Taken as a whole the work under way in the sub-programnme 'Technology, Work and Employment' (but also some of the research in SERV and COM) emphasizes the importance assumed by:

- conception phase of new tools and technical systems;
- study of cognitive aspects in man–machine interaction;
- mastering of adaptation processes and the transformation in qualifications and the acquisition of new

skills which demand the elaboration of appropriate training policies at European level (including the training of the educators), and in particular effective policies for social experimenting);

- research on polyfunctionality and flexibility in work organization; and
- general problem of a 'human resources policy' both at shop floor and office level.

Other aspects would also be worth a mention such as those concerning specific categories (the over 50s for example), new patterns of work (distance working in particular), certain groups of technologies (new materials and their impact on skills), certain industrial branches (tool machines), certain types of enterprise (in connection with the transnationalization of economic activities). We have, however, deliberately limited ourselves for the moment to emphasizing only those factors which seem to us the most significant both *in* and *for the long term*, namely the new man–machine relations which are beginning to make themselves felt.

Service activities and new technologies. The following preliminary observations may be drawn from the work of 15 associated research teams under contract. The cultural diversity of the different European countries, however, means that in this area above all, attempts at generalization are highly delicate, and risk assuming an abusively reductionist character.

The *development of service activities* is continuing and is spreading. This phenomenon is starting to be taken into account in the strategies of economic and political decision makers (as can be seen from the negotiations for the new round of GATT talks) but only in a fragmentary and rather inconsistent manner. There is a disturbing *lack of proportion* between the economic role of services and the attention given them by decision makers in both public and private sectors, in particular as regards economic adjustment and industrial redeployment strategies and policies for European integration.

In *international competition*, services for firms and for manufacturing are playing an increasingly decisive role and becoming a factor affecting the *competitiveness* of industry in the same way as wage costs because they make a direct contribution to the viability and efficiency of the firm and to its ability to adapt and innovate. They often incorporate a great deal of high technology and are frequently 'tradeable'.

The work in progress shows that Europe has certain strengths and weaknesses. In a fairly large majority of cases European firms providing services to companies are among the world leaders and their financial situation is sound. But technological leadership is rarely acquired by Europeans themselves, which puts European firms in a situation of dependence, especially as regards innovation (new services based on new technologies).

With certain exceptions, the European market remains often very protected and foreign penetration is low; this probably accounts for the wide variety of attitudes adopted by service companies to the liberalization of trade in services. The material and intangible infrastructure needed for the development of advanced services is starting to be established in different European countries. However, their development at *community* level for the moment remains fragmentary, with a low level of integration (barriers of various kinds, lack of common standards, etc).

Again in the international field, the production and marketing of services (or complex combinations of products and services in close association) depend greatly on world networks—telecommunications systems, information systems and databases, financial circuits, sales networks, etc. The real issue in international trade, therefore, is no longer located *only* at the traditional level of barriers and restrictions in the narrow sense to trade of products and service. It now applies more and more to questions of *access* to these networks.

The new technologies, especially information and communications, hold out prospects in the medium and long term of major and even radical changes in the production, distribution and consumption of services. The fields most affected are those activities tied to the process of the 'dematerialization' of productive activities (industrial services for automized production units: maintenance and servicing, training, advanced engineering). In the case of traditional tertiary activities, administrative services are equally involved (information processing), education, financial services, radio and television and the press, and to a lesser extent (at least for the moment) commerce and health. It would seem that as in manufacturing industry, process innovations will be much more developed than product innovations because the latter, to an even greater extent than in the secondary sector, require highly qualified staff to implement them. The social consequences of these tendencies will be of considerable importance.

First, at the level of employment, it is not at all clear whether services will take up the slack of the manufacturing sector. New employment created in rapidly growing tertiary sectors (professional services for firms, certain services connected to health, well being and leisure for example) risks being counterbalanced by significant reductions deriving particularly from the priority often given to process innovation (office technology, automation and administrative tasks, the incorporation of services into the product).

In addition, 'new services' risk seeing their development held back by a lack of qualified personnel. At job level, important transformations in the *content*
of tasks are to be expected, leading
need for new qualifications, skill
technical capacities. One can
that supply will be less than d
both in quantity and quality.

And finally as regards impact
individual level, a number of wo
progress do not point to very opti
conclusions. Current tendenci
rationalization and to the 'industri
tion' of services, risk leading
deterioration in quality and vari
services for large groups of the p
tion and to an *increased duality*
society between families or firms
will have a sufficient technological
(in terms of equipment and tec
culture) to benefit from the new se
and those which have not.

The new strategic industrial system of
munication. All the research
associated in the programme
started their research and met
working seminar on 3–5 July
Apart from methodological questio
which there are continuous exch
between the contract teams and
FAST team, it has been possible in
first stage to verify the relevance of
research portfolio and identify a
lines of force.

The technological trend in *netwo*
of course towards integration but
towards flexibility, which indicates
there is likely to be a strong impact
uses. For example, portability app
to be an important aspect of
flexibility and the idea that each of
will carry with us a communica
gadget like a sort of artificial aid
gaining ground. The requirement
network flexibility is a real challeng
innovation (miniaturization,
contained equipment, integration
radio transmission and cabled netwo
and also applies, on all fronts (termi
transmission, switching). The conti
tion of the research should show how
this requirement really merits priori

The *media* explosion and the diver
of national situations tend to obscure
context in which the actors concer

take decisions. Technical and regulatory requirements always in step and this has strategies to misfire (under- in the cable networks in the difficulties of launching 'Canal is fair to say that the situation media is extremely chaotic, because of the failure of authori- take decisions. At the same time, shows the importance of the which the media are financed: on whether their revenue from advertising, a licence fee, a ption or an hourly price, the ment of programmes may be ferent.

nature of *final demand* is still in. It is difficult to analyse since efit of any system to consumers is dependent on the use of the system by others. What use is mail until a critical mass of pulation has access to it? What 'home shopping' if only one ten is equipped for it? Con- the validity of social ments depends largely on how the innovation under test is ble in the surrounding social but it is impossible systematically out full-scale experiments to whether the equipment and proposed genuinely satisfy ements.

from companies is extremely and relates both to IT products to a legal framework allowing them to the courts to settle conflicts from IT transactions. In fact ments between partners are always and there is no need to wait the legislator is ready to act before ding them. It is clear that the lack regulatory and legal framework has hibiting effect on IT transactions in the event of disputes, are not in a position to produce and must therefore take pre- ions for their own security.

All these factors show, each in its own that the development of the communication function inevitably involves the public sector. It is up to public authorities to – introduce *greater transparency* with regard to the development of the communication function. Its failure to do this would give an advantage to those companies whose strategy is designed outside Europe and is not necessarily compatible with Europe's long-term interests. It would also come down to penalizing a European private sector unable to devise its own long-term strategy for lack of any 'institutional security'.

The right level for this approach is obviously the Community level since it is quite clear that, for example, as far as satellite TV, commercial transactions, and the terminal market are concerned, national frontiers are outmoded and ineffective. For communications, the public sector must therefore organize itself at Community level. In addition, the approach must be integrated: it is necessary to coordinate network and terminal development; it is essential to coordinate support for R&D and the production of the regulatory framework allowing new uses to develop; it is essential to coordinate the programme industry and the granting of licences.

Integrated Community action in the field of communication—this is called for very clearly by the initial results of the research. What form should that action take? The continuation of the research will help to define it.

The future of the food system. Research results are not yet sufficiently advanced to draw strong conclusions, but some general tendencies and hypotheses which provide the background to the studies may be presented.

Relative household expenditure on food is down, but trends in individual consumption patterns are difficult to identify because of lack of disaggregated data on consumption (in and outside the house) by individuals in different regions and with different socio-economic characteristics.

Changes occurring in our modern industrial societies around themes linked to health also affect attitudes towards food. Parallel to the development of jogging, fitness centres, etc, more and more consumers are becoming interested in health aspects of their food consumption pattern. In spite of doubts about the real impact of food on health, the tendency towards 'more healthy' habits is increased. Different actors in the food chain, manufacturers but mainly distributors, have already integrated this fact into their development strategy.

In European countries, as in the majority of modern industrial societies, the main problems of health linked to nutrition are the result of excessive consumption or badly balanced diets. Under these conditions, it is essential that those involved in nutrition and health problems arm themselves with appropriate tools to enhance the public's knowledge of nutrition and its ability to act on that knowledge. The development of education and information programmes on food in the school curriculum or through the media, nutritional labelling etc, are important examples.

In addition to nutrition, other health-related matters of concern include the contamination of food by microbes, heavy metals, pesticide residues, hormone residues, food additives etc. Evidence about these is being collected.

The new technologies applicable to food, especially in the field of biotechnology, are not confined within agrofood industries. This makes the agrofood field accessible to firms from other sectors, including the chemical, petrochemical and pharmaceutical sectors.

The result could be a tendency for food companies to become integrated with companies in other sectors or, more radically, a trend towards the taking-over of certain food production operations by 'newcomers', who, with the backing of a sound financial position
and proven industrial manageme
know-how, could well become leaders
various subsectors. Thus, fo
production could to some extent slip
of the hands of the companies in
industry, the most vulnerable bei
perhaps, the smaller firms.

The food manufacturing industry
faced with a powerful downstre
sector, the distributive trade, which
concentrated and organized. Many fo
manufacturers try to free themse
from the constraints this imposes
combining and endeavouring to deve
a more aggressive marketing policy.

From the upstream point of view,
recent discussions held in the Co
mission on the future of the Comm
Agricultural Policy (CAP) have sho
that the CAP must gradually mo
towards a better matching of supply
demand within the Community
towards giving proper consideration
new industrial development polici
made possible by scientific
technological progress. This develo
ment, which is gradually taking sha
must bear in mind the many possib
uses of agricultural land and produc
and the necessary grading of agr
cultural raw materials in the light of
processing industries' objectives (pr
cess automation, improvement of en
product quality, development of ne
products, etc).

Finally, at world level the trends
extremely complex to assess. Th
combined effects of plant and enzym
technology may well lead to greater
sufficiency in the provision of foodstuf
While trade in raw materials see
likely to suffer, the trend to hig
value-added food exports by Thi
World countries could be stimulated.
contrast, the participation of indu
trialized countries in world food tra
should shift increasingly in the directi
of technology transfers.

Integrated development of renewable natu
resources. These initial research activiti
have tried to specify the principle lines
development leading to a *revision of*

practice as regards the management and exploitation of natural resources and to the *integration of policies* dealing with agriculture, industry, energy, forestry, the environment, fishing, etc. Among these, the following elements would be worthy of note:

1. *Improvement of our basic knowledge—an approach based on complexity.* The development of our knowledge, in particular in thermodynamics of open systems and in life sciences (physiology and ecology for example) combined with the development of models, allows us a better understanding of the complexity of the mechanisms and regulations according to which all living systems (including human societies) make use of the constituents of their environment to develop, maintain, and reproduce their structures.

In particular, there is a better recognition of the importance which should be given to relations established between different components of the natural milieu, through the biogeochemical cycles among others, for the evaluation of long-term development strategies for renewable natural resources. This reinforces the relevance of the concept of "integrated management" of renewable natural resources.

Our greater understanding of the dynamic and complexity of the living world should in addition lead us to intervene in the procedures for optimizing the economic development of factors such as: the rhythm of reconstitution of natural resources, the resilience of ecosystems', genetic variability etc.[16]

2. *Increase in competition between the different branches using the products of photosynthesis.* Progress in molecular biology, chemical and enzymatic engineering, together with process engineering, provides us with a new arsenal of mechanisms for redirecting the products of photosynthesis for our own purposes. The characteristic features of this evolution in science and technology are defined on one hand by a more precise mastery of the processes of reproduction and development of living organisms (one can envisage their tailoring to measure in function of specific uses), and on the other hand by equally elaborate raw material transformation processes (in particular fractioning and recombination).

Such development will promote the interpenetration of different branches using the products of photosynthesis (agro-food, energy, chemicals, paper, construction) and may lead to competition for the same type of production (cereals, for example). It will be necessary to see that production structures adapt to this development. New relations will have to be established between the different agents within a particular branch—one can think, for instance, of the development within the rural milieu of centres for primary transformation of agricultural raw materials, whose vocation will be to furnish primary products on demand for the chemicals, energy and agro-food industries.

3. *The need for land management in line with different activities.* The transformation of the productive structure also redefines lifestyles and the location of different activities. The future will be marked by a competition for space between leisure (tourism, sport), residential areas and productive activities.

It is necessary to ensure that different land uses are harmonized and do not enter into conflict. We must also be prepared to preserve certain natural habitats, which are essential, particularly for the preservation of biological diversity.

These first studies have also helped towards a better identification of the *context* determining the implementation of long-term development plans for the Community's renewable natural resources.

Growth of international competition. Agronomic progress is not limited to industrialized countries. The adaptation of industrial crops to critical natural conditions makes comparative advantages based on soil and climate less decisive, and various developing countries today achieve productivity levels which allow them to compete with industrialized countries, both in the area of agro-food production and outlets opened up by other sectors. Competition on a world scale therefore is aggravated, even within the same branch. Such competition may well increase in the future, given the important productivity reserves still existing in various developing countries.

The world dimension and the development of the geo-political context. Europe's dependence in the case of wood and derived products, its extreme interdependence of agriculture at a world level, and the growing disequilibrium between supply and demand for foodstuffs are widely acknowledged.

The international dimension of environmental problems is also widely recognized: acid rain, increase in the atmosphere's CO_2 content. In addition, we are currently witnessing an aggravation of relations, particularly between rich and poor countries—for access to, as yet, little or unexplored resources: tropical forests, the seas and oceans. All these factors are sufficient to demonstrate the international dimension of policies for the development of natural resources and the importance which should be accorded to the implementation of appropriate measures for coordinated *action* at this level.

Enlargement to the 12. Enlargement of the Community to include Spain and Portugal shifts Europe's centre of gravity to the south. This makes the resighting of priorities all the more urgent for the definition of intervention in the questions of agricultural policy, forestry . . . together with scientific and technological policy.

Concertation structures. There is an evident lack of coordination between the different interested parties in the development of renewable natural resources: public authorities, researchers, farmers, industrialists. Each acts on the basis of its own particular logic without taking into account the possible convergence between the different activities connected with resource development and new industrial policies made possible by the progress of science and technology.

In the area of modelling, for example, European expertise is certainly significant, but it is fragmented and dispersed, and advances are disconnected. In addition, with the exception of specific applications (climatology, for example) the models are little exploited as aids to decision making. There is much to gain, therefore, from improvising interaction at all levels between users and producers of such models.

For the Community, the question is particularly that of reinforcing dialogue within existing structures, both at the level of scientific and technological cooperation, and for the integration of key elements of different policies and activities of Member States as regards agriculture, sylviculture, the environment, chemicals, energy, etc.

Adapting the relevant common policy instruments. The instruments of relevant Community policies (CAP, environment, energy, R&D, etc) are perhaps not well adapted to the needs of renewal which are on the agenda. They are often oriented to specific objectives of a particular sector, and do not favour an integrated approach which would allow, for example, for the conciliation of certain objectives for the preservation of the environment with the imperatives of industrial competitiveness. In addition, the panoply of existing measures are not sufficient to confront certain problems such as training and information in the rural context, assistance and follow-up of reconversion projects.

The above considerations should be re-examined in the light of ongoing research. It will be necessary to specify their economic and geopolitical frameworks, both at European and world level, and analyse in more detail their implications for the relevant Community policies.

Towards a European cooperation system

As the current scientific and technological situation shows, European cooperation is difficult to achieve. It is not as intense and extensive as one may be led to believe although certain recent initiatives, particularly on the part of business, constitute promising indications of a will to correct current practice.

Under these conditions forward thinking on the role of science and technology as strategic factors in the common development of European societies remains weak, vulnerable and inadequate. That is why FAST, in accordance with its remit, has endeavoured to evolve a European concept and practice of forward research by promoting the establishment of a European cooperation system.

Two years ago a leading European daily (*le Monde*) wrote in an article on the results of FAST I 'European forecasting is born'. Today, the European system of cooperation is based on the structure described above:

- 65 contract research teams;
- an institutional network of ten national units designated by the Member States;
- scientific fellows seconded to the FAST programme by national authorities; and
- more than 90 other researchers taking part in the *ad hoc* research networks on specific subjects.

All in all the FAST network currently involves, in varying degrees, several hundred people (and institutions) not only from the scientific and academic world but also from industry, labour organizations and government circles. Admittedly, there is no shortage of problems, inadequacies and shortcomings. It is no easy task to encourage cooperation, especially as it is often an expensive business and the most profitable results are not perceptible for a long time.

Nevertheless the FAST network is clearly starting to perform a dual function. It is acting as a catalyst by concentrating European thinking on the fields selected for the programme. One of the most recent examples is the report submitted by the National Economic Foundation to the Technology and Resource Development Commission in the Netherlands which suggests launching a national research programme on services based on the subjects selected for the FAST programme. Work has also been started in Flanders (Belgium), in Ireland, in Apulia (Italy), in Greece, etc.

It also performs the task of integrating FAST work with activities in the Member States by encouraging the establishment of close links between joint research at European level and national research. The most striking example is the link established in Belgium between FAST research and national research projects backing up the FAST programme on the same topics and bringing together about a hundred Belgian research teams. Mention may also be made of the links between FAST and PIRTTEM (an interdisciplinary programme of research on technology, work, employment and lifestyles) in France or between the work on the national technology and society programme in Denmark and a number of FAST research activities.

Obviously there is still a lot to do. Progress will depend above all on the willingness of individuals and institutions to commit themselves to the system of cooperation and, to a lesser extent, on financial resources. The development of a European school of thought for forecasting must occur around future projects of common interest, determined on a cooperative basis. In this way and on a modest scale such a cooperative system can contribute to the development of long-term initiative capacities for a more autonomous Europe.

FAST II programmes

Relationships between technology, work and employment (TWE programme)

In Europe, *employment* is likely to continue to be a major problem throughout the 1980s, one of the intervening factors being the technological changes brought about mainly by new automation, information and communications technologies. The tidal wave of process *innovations* that has radically changed *production apparatus* the advanced industrialized countri over the past 20 years will sweep on the form of the increasing disseminati of *new advanced production equip* (robotics, flexible manufacturing tems, etc) and the slow but penetration of the new biotechnolo and new materials. This will speed the *processes whereby human work is rep by the machine* as a source of mecha energy and/or manager of repetitive routine information of a low value.

The future of employment does depend solely on technology and its however. As employment is one of essential dimensions of *work*, it is that a (long-term) solution to unem ment should be found by *innovati work*, among other things by *separati*

TABLE 2. TWE PROGRAMME NINE RESEARCH ACTIVITIES

	Project	Research teams (nationality)	Associated teams (nationality)	Joint financing (nationality)
TWE 1	European scenarios for work	Miunin Teoronta (IRL)	a) Jens bisballe Planlaegning (DK) b) Foundation for Alternatives (UK)	
TWE 2	The end of the farmworker-new farmworkers	Université de Gembloux (B) An Foras Taluntais (IRL)		SPPS (B) AFT (IRL)
TWE 4	The brain workers	Battelle (D)		BMFT (D)
TWE 6	Distance working	A.D.R. (F)	a) Tavistock (UK) b) EMPIRICA (D)	Carrefour Int. de la Com. (F) ADR (F)-EMPIRIC (D) Tavistock (UK)
TWE 6a	Addenda	A.D.R. (F)	idem	PTT (F)-BTC (UK)
TWE 7	Robots and new production systems	IREP Grenoble (F) ROSKILDE Univ. (DK) ISI (D) VRIJE Univ. (B)		LEST/CNRS (F) NRF (DK) EMFT (D)
TWE 8	Industrial prospects for the technologies of light	KFA Jülich (D)		KFA Jülich (D)
TWE 9	Industry in transformation: the new materials	Univ. Strasbourg (F)		CNRS (F) Commissariat Plan (F) Region (F)-Univ. Pasteur (F)

of work and paid employment (thereby
ging about a new relationship
en income and work) and by pro-
g new man–machine relation-

at type(s) of innovation(s), then?
European work scenarios? What will
future hold, for example, for the
workers', the farmworkers and
ver-fifties?
hat will be the scope and sig-
nce of distance working over the
ten or 15 years?
e *employment issue* arises mainly in
facturing industries (mature and/or
ding) and *services*: what then will
the implications and consequences
Europe and its scientific and tech-
gical policy of the new *integrated*
manufacturing systems, the *new*
rials and the 'technologies of light'?
These are the questions to be tackled
the TWE programme in its nine
arch activities that should provide
raw materials for five 'products' (see
ble 2).

scenarios for work.
strategic dossiers.

- *Man–machine relationships*, the goal of which is to identify and set up a hierarchy for the technical, economic and social challenges of the increasing automation of human activities in order to suggest technological innovation policies centring on man rather than the machine.
- *Manufacturing sectors in turbulence*, the aim of which is to identify the development options open on a European scale to manufacturing industries in turbulence that will remain of major importance for growth and employment.

exploratory dossiers:

- *Transnational and local technologies*, where an attempt to identify the new relationships between the dynamics of the transnationalization of technological and economic systems on a worldwide scale and the processes of exploiting local resources and local uses of the new products and services associated with technological change.
- *The self-employed*, the aim being to investigate the possible scope and practical significance in European societies of new forms of 'independent' patterns of employment. It would consist of an in-depth study on one aspect of the work being carried out under the heading of European scenarios for work.

Service activities and technological change (SERV programme)

In the Community countries, service activities occupy a leading position: for some years now, more than one person in two has been working in the tertiary sector (public or private) and most of the added value is obtained in that sector.

A major new phenomenon has recently added to this considerable economic and social significance: the current technological changes are helping to transform the very nature of production tasks and it seems increasingly probable that service activities are also (and perhaps especially going to play a major role in the organization and operation) of production systems.

What role can Community science and technology play in this process? In more general terms, how can the Community incorporate this new factor —the increase in service activities—into its long-term development policies and into their scientific and technological and also industrial, commercial, social and regional components?

The aim of the FAST programme is to propose new guidelines and approaches for an integrated and consistent common action. To achieve it four 'products' have first to be produced.

Two strategic dossiers analysing the long-term issues for the Community in two key fields:

- *Services and firms* (what requirements will European services and firms have in the way of services, und what conditions can they obta these services and with wh consequences?)
- *Services, infrastructures and regi* (how can regional policies

TABLE 3. SERVICE ACTIVITIES AND TECHNOLOGICAL CHANGE

	Project	Research teams	Associated teams	Joint financing
SERV 1	Productivity in the services	Fonds Européen de Coopération (B)		Services de la Programmation d la Politique Scientifique (B)
SERV 2	Technical tools for new services	Technical Change Centre (UK)	Experts nationaux	Technical Change Centre (UK)
SERV 3	Households and services	Bureau d'Information et de Prévision Economique (F) University of Waegeningen (NL) Science Policy Research Unit (UK) Centro Studi Economica Applicata (I) Université Libre de Bruxelles		Bureau d'Informa-tion et de Prévis Economique (F) Agricultural University (NL) Jos. Rownee Memorial Trust (U Emilia Romagna Services de la Programmation d la Politique Scientifique (B)
SERV 4	International division of labour and markers	Centre for European Policy Studies (CEPS) (B)	Centre d'Etudes Prospectives et d'Informations Internationales (F)	Commissariat Général au Plan (Ministère des relations Extérieu (F) Centre for Europ Policy Studies (B)
SERV 5	Services for the manufacturing sector	Metra Conseil International (F)	IRES (B)	Public authorities Plan, Ministère de l'Industrie, Ministère, de la Recherche (F)
SERV 6	Role of services in Regional Department	Centre for Urban and Regional Development Studies (UK) Nederlands Economish Instituut) (NL) Institut de Recherche sur les Innovations Sociales et la Technologie (F) Fondazione Centro Studi Investimente Sociali (I) Sydjysk Universitetscenter (DK) + fellow		Economic and Social Research Council (UK) University of Newcastle (UK) Erasmus Universiteit (NL) Conseil Rég. de Lorraine (F) CNRS (F) Cassa di Risparm di Basilicata e Calabria (I) CENSIS (I) Esbjerg Kommun (DK) Ribe Amtsrad (D
SERV 7	The future of financial services (Conference)	Commission Departments + fellow	SEDES (F) Univ. Gottingen (D)	Caisse des Dépôts et Consignations (

adapted to the development of service activities, what infrastructures need to be provided to encourage this development?)

exploratory dossier putting into perspective the most significant developments for the Community in *the services of the future* (what they will be, how and why they might contribute to changing the lifestyles and work of Europeans).

One conference reviewing the knowledge available (in particular by means of an international conference in mid-1986) in one specific field of major importance for the Community: *the future of financial services* (what forms will they take, who will provide them, what developments could the Community initiate and pursue, what role will it play at international level?)

These four products will be elaborated on the basis of the results of seven research activities carried out in 1985 in cooperation with some 15 European research centres (see Table 3).

New strategic industrial system of communication (COM programme)

The combination of computing and telecommunications brings about an explosive increase in the number of possible uses for communications networks. Electronic switching, digitization of continuous sources, multiplexing techniques, the development of more efficient transmission media are all technical advances that make possible:

- interactive broadband communications;
- sharing of the same network by data, image and voice which are all converted into the form of binary digits (bits);
- a wider variety of terminals that can be hooked up to the network (telephone, computer, word processor, telecopier, payment systems, cellular networks); and
- the development of value-added services (automatic alarm call, diversion of calls to a friend's house, automatic warning system, electronic mail, meter reading, etc).

This integration of telecommunications and computing enables the use of a network to be substituted for a whole range of human activities; it completely reorganizes the field of activity around the use of networks. Economic and political activity becomes focused around the communication function.

In this situation, Europe has to face up to two strategic challenges: *the external challenge* which means that it has to ensure control of its own networks, and *the internal challenge* to give a meaning to its networks, to put them at the service of users (firms, local authorities, individuals).

The aim of the COM programme within FAST is to evaluate the opportunities and risks, for Europe, of communications and the transformation of the corresponding strategic industrial system. It will also be necessary to identify the various forms that communications can take and to propose ways of attaining them.

The results will be expressed in the form of five products:

DOS: communication industry. The aim is to identify all industrial and economic activities centring around communications and to establish the profile of the emerging strategic industrial system.

DOS: communication function. What are the possible developments of the communication function and the options and challenges it offers Europe to strengthen its position as a leading force in the 21st century?

NOV: challenges of space. Starting from the integration of major works available on the subject (particularly by the European Space Agency) the objective is, as an extension to the work on

TABLE 4. NEW STRATEGIC INDUSTRIAL SYSTEM OF COMMUNICATION

	Project	Research teams	Associated teams	Joint financing Sour
COM 1	Telecommunication industry: technological options and challenges	IDATE (F)	Naples University (I)	Comm. Gén. au Plan (F) Dir. gén. des télécommunications (F
COM 2	The media industry	Vrije Universiteit Brussel (B)		SPPS (B) VUB (B)
COM 3	Conditions of market operation	Deutsches Institut für Wirtschaftsforschung (D)	Kernforschungsanlage Jülich GmbH (D) Newcastle University (UK)	Anglo–German Foundation (UK, D)
COM 4	Final demand	Odense University (DK) Facultés Notre Dame de la Paix (B)		Odense Univ. (DK) Danish PTT (DK) SPPS (B) Fac. Notre Dame de la Paix (B)
COM 5	Structure affects of communication on other industries	OSPRI (I) FTU (B)		OSPRI (I) SPPS (B) FTU (B)
COM 6	The communication function retrospect and prospect	CEGOS (F)	UCL–L'Unité (B) d'histoire contemporaine	DGT (F) Caisse des dépôts et consignations (F) EDF (F) CESTA (F) ADI (F) INA (F) SPPS (B)
COM 8	Consequence of a global network	IVA (NL)		
COM 9	Telematic press	In-house fellow E. BASEVI (I)		

communication, to throw light on three or four fields of significance for the European Community, such as experiments in micro-gravity or space stations.

NOV: communication and development. How are communication transactions between North and South to be organized? In what way are the power relationships expressed? Should or could the Community consider a 'Communications Lomé' (why and how)?

A conference: telematic press. This conference will endeavour to take stock of various strategies brought about by new technologies in the press, as regards publishers, journalists, readers and manufacturers. The study of this twofold market (manufacturers–publishers and publishers–readers) and its dynamics is a case study full of strategic and socioeconomic challenges for Europeans.

To obtain these 'products', the programme will have the backing of eight research activities, the work of European teams and the FAST networks (see Table 4).

Integrated development of renewable natural resources (RES programme)

The idea of the *integrated development* of renewable natural resources as proposed in FAST emphasizes the need for man to manage renewable natural resources potential in the light of all the objectives assigned to its development (production of raw materials, recreation, waste disposal, etc) on the one hand, and the various factors governing the operation of the biosphere on the other. In other words, a new type of responsibility must be taken, on the management of the biosystem (see Table 5).

This calls for the harmonization of Community (and national) sectoral policies concerning the environment, agricultural, forestry, water and waste management, etc. In practice, this could take various forms such as a review of land use and farming practices, the preservation or redevelopment of 'ecologically sensitive' sites, the

TABLE 5. INTEGRATED DEVELOPMENT OF RENEWABLE NATURAL RESOURCES

	Project	Research teams	Associated teams	Joint financing Source
RES 1	Land recycling and renewal	ECOTEC (UK)	GENDAN (DK) (+ network) INFRU (D) ECOTEC (UK) (+ network)	Dept. of Environment (UK) + self-financing
	Measurement, detection and protection technologies in the management of RNR	BIPE (F)		Ministère Environnement (F) + self-financing
RES 2-3	Inventory and assessment of projection capabilities Designing an expert system for policy evaluation	UGMM (B) Free Univ./IVM (NL) SOW (NL) De Dorschkamp (NL) City University London (UK) University Osnabruck (D)	Coordinated programme network	SPPS (B) VROM (NL) self-financing self-financing self-financing Ministry of the Interior, FRG/German UNESCO MAB Office Bonn
RES 4	Forestry (contracts not yet finalized)			
RES 5	The impact of technology on the alternative uses for land	An Foras Taluntais (IRL)		Self-financing
	Prospects for non-food land use in Europe	National Tech. Univ. Athens (HE)		Self-financing + KEPE (HE) + Secre. of Youth Athens
	The role of biotechnology in assessing future land use within the EEC	Univ. Strathclyde (UK)		Self-financing
	Alternative uses for land and the new farmworker Segregation *versus* integration	Science Center Berlin (D)	INRA (F) Univ. Kassel (D) Univ. College London (UK)	BMFT (D) + Self-financing
	New crops for semi-arid regions of Mediterranean European countries	Reis Spa (I)	Univ. Milan (I) Bot. Garden Naples (I) Univ. Turin (I) Inst. Subtrop Crete (HE)	CNR (I) + Self-financing

implementation of a *long-term* management plan for Europe's supplies of renewable raw materials, the preparation of a waste disposal plan making due allowance for the constraints of environmental protection and conservation of natural resources, etc.

The work of FAST is to throw light on any inconsistencies and possible synergies between the various sectoral policies involved and to propose new ideas for integrated and consistent common action. The most relevant proposals will be presented in a final report: the 'Resources' PIC (Proposal for Initiatives by the Community).

FAST will base the preparation of this PIC on the following:

- Five research activities conducted in cooperation with more than 15 European centres specializing in the various disciplines involved (see table 5);
- The organization of several information and cooperation networks;
- The organization of a conference on biological diversity and property.

The interim results obtained in the five research activities will be presented in the following three FAST 'products':

Two NOV (exploratory dossiers):

- One will centre on the present and future economic, technological and socio-institutional difficulties preventing the Community countries from managing their *forest* resources efficiently.
- The other is based on the concept of the '*agro–chemo–energy complex*' developed in FAST I. It will examine the new potential connections, both technological and economic, which could develop between chemistry, energy and agriculture over the next 15-20 years.

One DOS (strategic dossier) which will describe the information base and the methodological or technical tools (in particular models) that could be used to improve *European capacity for long-term analysis and forecasting* in the fields covered by Syrena and to explore alternative Community (or national) policies.

Future of the food system (ALIM programme)

Given its vital function and front ranking role on various counts in the European economy, the food industry (and its future) represents a major issue for the Community. Particularly important questions for a long-term common research and technology policy are how the evolution of technologies and lifestyles are most likely to bring about changes in food consumption patterns and in the structure of the food industry and the many branches of which it is composed.

The purpose of this programme is to identify those questions regarding evolution of the European food system which correspond to 'Euro-problems' and for which the organization of a common policy is of strategic importance. It goes without saying that analysis cannot be directed exlusively towards definition of new European priorities and that the programme should also aim at producing useful recommendations for national public authorities and professional organizations concerned.

The research activities of this subprogramme will provide critical input to the preparation of two distinct FAST dossiers:

- The first is a 'strategic dossier' (DOS) devoted to the future of the European food industry. It will analyse the main changes in progress or expected changes in the food sector and issues which arise from them for the Community and Member States. The dossier will concentrate on the problem of

TABLE 6. FUTURE OF THE FOOD SYSTEM (ALIM PROGRAMME)

	Project	Research teams	Associated teams	Joint financing source
ALIM 1	Vegetable proteins, the innovation process and obstacles to development	INRA (F)	(+ Network)	Self-financing
	Structural change and public policy in the European food industry	University Stirling (UK)	(+ Network)	Self-financing
	Milk production and products—technological development, food policy and consumer aspects	Roskilde University Centre (DK)	(+ Network)	Danish Research Council of Social Sciences
ALIM 2	Technological change in agriculture and the food industry and public policy in relation to food production, nutrition and consumer safety	An Foras Talutais (IRL)		Boyne Valley Foods (IRL) + self-financing
	Consumer information and education	University of Bradford (UK)	Coordinated programme	ESRL (UK) + SERC (UK) + self-financing
	Developing new strategies in relation to food and health from a life science point of view	University of Bremen (D)		

managing technological change and innovation in the agro–food industry bearing in mind that we are dealing with a transectoral, heterogeneous structure where biological, chemical engineering and electronic techniques converge.

- The second is an 'exploratory dossier' (NOV) aimed at drawing attention to the relationships between food practices and health and to the major changes that could be required with regard to food production, consumer protection and the European food industry in general.

For the preparation of these dossiers, FAST will use the results of six research contracts, complemented by contributions from several European information and cooperation networks (see Table 6).

Notes and references

1. The term used in the title of the 1979 Danzin report to the Commission on Science and Renaissance in Europe.
2. See "L'impact des biotechnologies dans le tiers monde", *FAST occasional paper Nr 55*, Brussels 1983 and "Quelle informatique pour quel développement?", report by the International Association Futuribles to the Commission, Paris, June 1985.
3. Today this principle is increasingly prompting national authorities to take measures in this field. Examples include

the campaign launched in Federal Germany by the Federal Ministry for Research and Technology on "Sozialwissenschaftliche Technikforschung", the new five-year research programme entitled "The context of change" of the Economic and Social Research Council in the UK and the major programme recently approved in Denmark on technology and society.

4. This work, conducted around three priority themes in the programme (work and employment, the information society, biotechnology and society), has yielded around 100 research reports distributed throughout the scientific community and still in wide demand.
5. See the final report on FAST I, Eurofutures, the challenges of innovation (also available in Italian and French).
6. See Annex 1: Council Decision approving the FAST programme.
7. Cf *inter alia* the conclusions of the research "Job creation synthesis report", *FAST series No 16*, 1983.
8. See Annex 3: the subprogrammes in brief.
9. See Annex 2: budget data.
10. See OJ No C 66. The call for proposals closed on 20 May 1984. The Commission received more than 300 research proposals.
11. The sources of joint financing are given in the summary tables in Annex 3.
12. Mention should be made here of the January 1984 conference on the relationships between technology, work and employment organized by FAST jointly with DGV, CEDEFOP of Berlin and the European Foundation in Dublin; the four workshops on 'distance working' organized in FR Germany, the UK, France and Belgium and the three meetings for SERV 2 (technical tools for the new services) organized in Ireland and the UK.
13. On this occasion the Belgian authoriti presented a number of importa national initiatives in support of the FAST programme to which some hundreds of researchers are associated.
14. On the basis of 'in house' work by the FAST team particularly with regard t the research 'Scenarios for work i Europe' and the drawing up of the strategic dossier on "man–machine" relations. We would also refer to other recent studies dedicated to this question, C. Freeman, L. Soete, *Informa Technology and Employment—An Asse ment*, (Paris, France, IBM Europe, Ju 1985); W. Friedrich, G. Ronning, *Arbeitsmarktwirkungen modernen Tec nologien*, 2 vols (ISG Koln/Konsta April 1985); and *Information Technolog and the Organisation*, a Policy Studie Institute study within the PANT project, London, June 1985.
15. Interesting analyses on this question a to be found in some of the research reports presented at the FAST conference, "The press and new technologies—the challenge of a new knowledge" (Brussels, 7–9 Novemb 1985).
16. René Passet, "L'économie: des chos mortes au vivant", *Encyclopédia Universalis*, 1985: "Nous devons assurer l développement de la sphere productive, en interdépendance avec l'ensemble d ses environnements, sans réduire c derniers à une logique marchande qui n'est pas la leur et sans silu l'économique dans un biologisme ou un écologisme où disparaîtrait s spécificite".

Appendixes

Appendix 1. Council decision

Council Decision
of 17 October 1983
adopting a research programme of the European Economic Community on forecasting and assessment in science and technology (FAST) 1983–1987
(83/519/EEC)

The Council of the European Communities

Having regard to the Treaty establishing the European Economic Community, and in particular Article 235 thereof,

Having regard to the proposal from the Commission,[1]

Having regard to the opinion of the European Parliament,[2]

Having regard to the opinion of the Economic and Social Committee.[3]

Whereas Article 2 of the Treaty assigns to the Community the task *inter alia* of promoting throughout the Community a harmonious development of economic activities, and a continuous and balanced expansion and an accelerated raising of the standard of living;

Whereas the mobilization of science d technology constitutes one of the sible mechanisms for stimulating a umption of growth in the Member tes;

Whereas, by its resolution of 14 uary 1974 on the coordination of ional policies and the definition of projects of interest to the Community in the field of science and technology,[4] the Council entrusted to the Commission the task of defining actions of Community interest and of selecting the ways and means appropriate to the implementation of these actions;

Whereas research and development activities (R&D), integrated in an overall concept of social and economic policies, have become one of the essential strategic means for realizing the long-term objectives of the Member States and of the Community;

Whereas one of the instruments for the regular revision of the programme framework for Community R&D and the adjustment of its priorities in response to current and foreseeable developments is the analysis of possible long-term scientific, technological and socioeconomic changes;

Whereas, by its Decision 78/668/EEC,[5] the Council approved a research programme of the European Economic Community on forecasting and assessment in science and technology, designed to test, over a four-year period, the usefulness of such an activity for the selection of broad long-term directions for Community R&D; whereas his programme ends on 16 August 1983;

Whereas the results of the aforesaid programme, known as FAST, have demonstrated the inherent usefulness and particular need in these difficult times of reflective study on long-term scientific, technological and socioeconomic developments in the Member States as a basis for the definition of long-term objectives and action priorities, particularly in science and technology;

Whereas the effective utilization at Community level of the results of significant forecasting and assessment activities in science and technology carried out in the Member States, by various new public and private research agencies among others, requires the reinforcement and multiplication of cooperative European networks;

Whereas the Treaty does not provide the specific powers of action required for the adoption of this Decision;

Whereas the Scientific and Technical Research Committee (CREST) has delivered its opinion on the Commission's proposal.

HAS DECIDED AS FOLLOWS:

Article 1

A second research programme of the European Economic Community on forecasting and assessment in science and technology, FAST, as defined in the Annex, is hereby adopted. The duration of the programme shall be from 17 August 1983 to 31 December 1987.

Article 2

The funds estimated as necessary for the execution of the programme shall be 8.5 million ECU including expenditure on a staff of 12. In addition, Member States will be invited to second visiting fellows to the FAST unit up to 20 men/year
the whole duration of the progra
under the conditions defined in
Annex.

Article 3

The Commission shall be responsible
the implementation of the progra
It shall be assisted in this task by
Advisory Committee on Progra
Management to be set up by the C
mission.

Article 4

The Commission shall inform
Council and the European Parlia
by two interim reports (mid-1985
end of 1986) on the state of progre
the research activities.

The Commission shall arrange for
results of the programme to be evalu
by an independent group, and
make a report to the Council and to
European Parliament at the end of
programme.

Article 5

The dissemination of information
ing from the execution of the
gramme shall be in conformity
Regulation (EEC) No 2380/74.[6]

Done at Luxembourg, 17 Oc
1983.

For the Council
The President
G. VARFIS

The main aim of the FAST research gramme is the analysis of scientific d technological changes in order to light their long-term implications consequences for the Community's D and other policies over the next , seven and/or ten years and to pose timely policy options.

The activity will concentrate on three in fields of investigation:

1. *New forms of 'growth' for Europe*
   1.1. Technology, employment and work
   1.2. Integrated development of renewable natural resources

New strategic industrial systems
   2.1. Communication
   2.2. Food

3. *Transformation of service activities and technological change.*

To achieve the aim defined in point 1, programme has two principal tasks the three areas envisaged in point 2:

to highlight the prospects, problems and potential conflicts which may affect the long-term development of the Community, and hence to propose new long-term orientations for Community action, particularly in the field of science and technology;

to make use of long-term research studies undertaken within the Member States.

The execution of these tasks will be nly through the following modes of on:

—development of the activity of the programme on the basis of a network of some 10 national research units identified in cooperation with the Member States. The form and functioning of these networks will be defined with this units

—association of Community centres of research teams with capability in the analysis of technological change with the execution of the scientific work of the programme

—promotion of *ad hoc* networks for information and collaboration at Community level. These networks to be as flexible and informal as possible. The participation of representatives of industry, labour and associated movements is to be sought

—secondment to the programme by Community and national institutions (governmental, academic or professional) of visiting fellows

By 'visiting fellow' is meant a person who is seconded to the Commission of the European Communities to work as a member of the FAST unit for a limited period of time. A visiting fellow may be:

(i) a civil servant professionally involved with the analysis of long-term problems and prospects, particularly in the fields of science and technology;

(ii) a senior researcher or professor of outstanding competence in a particular area of science and technology;

(iii) a junior researcher beginning his career or preparing his Ph.D or engaged in post-doctoral specialization.

In the cases referred to in (i) and (ii), Community rules adopted by the Commission on 19 January and 23 December 1976 as regards covering the costs associated with the secondment of national experts to the Commission services (category XI, item 1, heading No 11.73 of the research programme budget) will be applied.

In the case referred to in (iii), special grants made available by the Commission to enable scientists and engineers at various levels of training to collaborate in the implementation of the different Community research programmes to acquire specialist knowledge in fields covered by these programmes be granted.

Appendix 2. Budget data (breakdown by type of planned expenditure)

	ECU
Permanent staff (6A, 1B, 5C)	3500000
Secondment costs—fellows	600000
Operation of networks (including computerization)	1500000
Operating expenditure (publications, running costs)	700000
Contract research (shared-cost)	2200000
Total	8500000

Appendix 3. The subprogrammes in brief

The relationships between technolog work and employment (TWE P gramme)

Service activities and technologi change (SERV programme)

The new strategic industrial system communication (COM programme)

The integrated development of rene able natural resources (RES p gramme)

The future of the food system (AL programme)

Notes

[1] OJ No C 89, 31, 3, 1983, p. 9.

[2] OJ No C 184, 11, 7, 1983, p. 147.

[3] OJ No C 211, 8, 8, 1983, p. 9.

[4] OJ No C 7, 29, 1, 1974, p. 2.

[5] OJ No I, 225, 16, 8, 1978, p. 38.

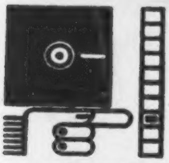
[6] OJ No I, 255, 20, 9, 1974, p. 1.

Appendix 4. FAST programme—a general view

		TET Relationships technology-work employment	SERV Service activities and technologies change	COM New strategic industrial system of communication	ALIM Future of food	RES Integrated development of renewable natural resources	HOR Horizontal activities
MEANS OF ACTION	In-house staff	Werner Wobbe-Ohlenburg Chris Boulstridge	Olivier Ruyssen Anne De Greef	Nicole Dewandre Shirley Hatherton	Bruce Trail Betty McDonnel	Bruno Schmitz	The team
	Fellows *in place*	Dirk van der Werf (NL) (European scenarios for work)	Sven Illeris (DK) (Services regions) and	Enrica Basevi (I) (Telematic press)	John Wilkinson (UK)	0	0
	Fellows *to come*	Alberto Baldissera (I) (man-machine relations)	Ugur Muldur (F) (Financial services)				
	Research contract	0	0	2	1	2	1
		12	14	10	6	13	1
PRODUCTS	*PIC* Proposals for Community initiatives		The Community and services			Management of natural resources in Europe	Human resources
	DOS Strategic dossiers	Man-machine relations Industrial sectors in turbulence	Services and firms Services infrastructure and regions	The communication industries The function of communicating	The future of the food system in Europe	Natural resources forecasting tools	
	NOV New openings	The self-employed	Services of the future	The challenges of space	Food and health	Forestry: the challenges of the long term The agro–chemo-energy complex	Scenarios for energy
	CONF Conferences		The future of financial services	The press and the new technologies		Biological diversity	

FINANCIAL TIMES

SURVEY



The European Community's plans to dismantle internal trade barriers by 1992 is giving further strong impetus for joint ventures, mergers and alliances among Europe's high technology industries, as **Terry Dodsworth,** Industrial Editor, reports here.

FINANCIAL TIMES, WEDNESDAY, MARCH 22, 1989

European High Technology

1992 triggers a shake-out

EUROPE'S high technology industries have been galvanised over the past two years by the issue of 1992. Plans to unify the European Community's internal market have triggered a rash of mergers and rationalisation aimed at meeting technological needs.

These moves are mainly affecting companies in the fields of electronics, aerospace, defence and telecommunications – industries which, in the past, have sheltered behind national procurement and sponsorship schemes. In these sectors, companies are beginning to regroup to cope with the potential disappearance of policies which have kept foreigners off their home turf.

The re-organisations have a variety of aims, from the search for more economic scale, to savings in research and development, reductions in operating costs and access to new markets.

Perhaps the most striking example of these rationalisation attempts is the Anglo-German alliance which has brought together the General Electric Company in the UK with Siemens of West Germany in a bid for Plessey, the British defence and telecommunications group.

If successful, this proposal would create cross-border activities in both telecommunications and defence of the kind that may eventually be commonplace in the European electronics industry.

Other recent large-scale restructuring initiatives have been directed at the more limited objectives of creating larger national companies. These include Daimler-Benz's offer for MMB, the West German aerospace group, and the talks between Thomson, the French defence electronics company and the Aerospatiale aircraft manufacturing group.

Despite the national emphasis of these transactions, they are widely seen as the initial steps towards international expansion, since they form a stronger platform for foreign takeovers or alliances.

Many more of these sorts of agreement are expected. Indeed, several aerospace and defence companies make no secret of the fact that they are discussing deals and joint ventures virtually all the time.

In the telecommunications sector, where a wave of restructuring has already swept through the big public exchange manufacturers, a number of international transactions between smaller producers are under discussion; and in the computer industry, executives say that it is only a matter of time before the old national champions begin doing deals between each other.

These 1992-inspired rationalisation moves are the second step in the reorganisation of Europe's electronics and electronics-related sectors. The first was the more modest, but highly influential move to bring European companies together to pursue common research goals.

This programme - or programmes - began in the early 1980s when several Governments became increasingly alarmed about Europe's inability to maintain a competitive position in several fast-developing high technology areas. Failure in this sector was seen as a threat to jobs, to economic growth and to the efficiency of the industrial sector in general as it became more dependent on electronics technology.

Collaborative research has had a number of goals, to some extent modelled on Japanese ideas of cooperation in basic scientific work which is then taken into marketable products on a competitive basis.

In Europe, the fragmentation of the industry into a number of national entities has been seen as a weakness in the research area since it encourages too much duplication of effort in non-competitive areas.

At the same time, joint research and development has

Guide to Europe's collaborative research programmes

MAJOR programmes among nearly 70 collaborative projects include the following:

- **The Framework Programme:** the second five-year framework programme, costing around $8.6bn, was launched in 1987, to help co-ordinate research and technological development.
- **Esprit:** the European strategic programme for research and development in information technology and electronics; also assisting the EC in the setting up of international standards.
- **ESA: the European Space Agency** – with the exception of Greece and Luxembourg, all EC states are members of ESA and contribute to its budget.
- **Eureka:** an initiative by France and approved by all European states, outside the Communist bloc, to bring together companies for collaboration in new technologies. Over 200 projects have been launched.
- **Jessi:** joint-European submicron silicon project to acquire silicon process technology for very large scale integrated circuits by the 1990s.
- **Jet:** the Joint European Taurus is a toridal magnetic machine, capable of containing plasma gases at temperatures close to those found on the sun. This equipment, located at Culham, Oxfordshire, is designed "to prove human mastery of thermonuclear fusion for electricity generation." The project is expected to be concluded by 1993.
- **Race:** research and development in advanced communication technology, with the main phase running from 1987-1991 for integrated broadband communication and common standards by 1995.
- **Brite:** basic research in industrial technologies and advanced materials.
- **Drive, Prometheus:** projects on road infrastructure and safer trafic flows; Drive was launched in 1988 to help apply information technology and advanced communication to European traffic movement.
- **Apollo:** a project using satellite transmissions to store-and-forward high-speed digital information
- **BAP:** biotechnology action programme.
- **Brain:** research in adaptive intelligence in neuro-computing to better understand how the brain works in areas such as problem-solving.
- **Flair:** food-linked agro-industrial research.
- **Tedis:** a two-year project for trade electronic data interchange systems to assist the EC's telecommunications equipment manufacturers.

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been promoted as a means of bringing companies of different nationalities together. By insisting on cross-border involvement of this kind as a quid pro quo for financial backing, the European Commission has helped companies develop more of a pan-European perspective. This is particularly evident in the Esprit programme in information technology, which is now entering its second five-year investment phase.

The only significant area of high technology excellence in Europe which has not been influenced by this shift towards joint projects is pharmaceuticals. In this industry, companies have jealously guarded their independence – but they have not been subjected to the same pressure on profit margins as electronics-related groups.

Elsewhere, the development of Euro-projects in research and development over the last five years or so has seemed inexorable, both in strong and weak sectors. Among the strong industries, for example, are:

- Aerospace, a sector where Europe runs a balance of payments surplus and has managed to retain its historic position in both engine manufacturing and aircraft construction. Companies in aerospace manufacturing, where activity is now centred on the Airbus consortium, have pioneered the use of new engineering materials and elec-

Continued on next page

EUROPEAN HIGH TECHNOLOGY

1992 shake-out

Continued from previous page

tronically-controlled flying methods.

- Defence: the principle of joint development of military aircraft is now well-established because of the exceptionally high cost of research in this field. The same approach is now being extended to other areas of defence electronics expenditure, such as radar and communications, faced with similar problems of escalating research and development requirements.
- In telecommunications, one of the most fiercely nationalistic of all industrial sectors, European companies are forging links in a number of areas.

Under the direction of the European Commission they are collaborating in RACE, an ECU1bn ($1.115bn) programme to facilitate the spread of high capacity "broadband" communications. And in the mobile communications field the industry has from its inception been developing on a pan-European basis; the companies involved are creating common standards, forming international research and market alliances, and more recently have begun taking equity stakes in each other.

In weaker high technology sectors, companies are entering collaborative arrangements as a way of fighting back against overseas competitors:

- In the computer industry, for example, where indigenous European groups account for only about 47 per cent of European sales, there has been a widespread shift to open standards under the influence of some of the region's largest groups. Every sizeable manufacturer is collaborating in research projects under the Esprit programme; and talks are currently going on in Brussels about more far-reaching co-operation.
- Semiconductor manufacturing has seen an even more ambitious attempt to bring together a variety of Government and corporate resources to drag the European industry up to the level of the US and Japan.

The latest joint project - Joint European Submicron Silicon (JESSI) - is aimed at co-ordinating the development of the next generation of products by bringing together all the main European chip producers, along with independent Government funding and a contribution from Esprit.

- In consumer electronics, where the Europeans have a patchy record despite their strength in television production - Philips of the Netherlands and Thomson of France are the world's two largest producers - the European Commission's special research effort into high-definition television (HDTV) is intended to give the industry a platform for the next generation of equipment.

These moves towards a pan-European structure in the high technology sector are not going on without a great deal of criticism. Many opponents of government-backed research schemes see these projects as the extension of traditional policies of national protection to a regional scale. They argue that the best stimulus for European companies would be to remove trading barriers and protective procurement procedures as quickly as possible.

Others contend that joint projects such as JESSI in semiconductors merely throw good money after bad in a sector where components are widely available on the world market. These sorts of programme, they argue, are hopelessly difficult to manage, and the money would be better spent on disseminating knowledge of new technologies throughout small and medium-sized companies.

Against this, supporters insist that collaboration, oiled by European funds, is of value in itself and a helpful preliminary to the structural shake-out that will have to come in the high-technology industries. Europe is doing no more in joint research than the Japanese have been doing for years, with outstanding success, they contend.

"The important point is to make sure that the research is pre-competitive and nothing more," says Mr Amedee Turner, spokesman for the European Parliament's committee on Energy, Research and Technology.

"Industry always wants to obtain funds for market-oriented projects, but we need to develop in the style of the Japanese, where companies work together in pre-competitive areas, but are fiercely competitive when it comes to developing products for the market."

Terry Dodsworth reports on the acceleration in collaboration

New wave of alliances

THE 1980s are proving to be the era of collaboration in the European electronics industry. Without exception, the key areas of manufacturing – from computers to semiconductors, telecommunications equipment and military electronics – are being affected by a wave of alliances and co-operative ventures. Virtually no-one has been immune: the trend has affected indigenous European companies and foreigners alike.

The recent acceleration in co-operative activities is related both to the internationalisation of trade and the rise of research and development costs. In technology-based industries, particularly those connected with electronics, competitive pressures have been brought to bear on companies which in many cases have been protected from overseas competition in the past; and the escalation in research expenditure has prompted companies to share results and avoid duplication of similar work.

Despite the generalised nature of this phenomenon, however, the nature of the joint ventures vary widely, from very close collaborative projects involving crucial aspects of a company's business, to fairly loose co-operation in peripheral businesses.

Some of the collaboration is national and some of it is cross-border. A great deal of it involves large multinationals working together on different continents.

Among the most common forms of activity are the following:

■ **Research and development agreements:**

The underlying impetus towards joint research projects lies in the pace of change that has been ushered in by the rapid development of the semiconductor industry and the application of digital techniques to telecommunications. Both of these changes have made their impact in an extraordinarily short period of time – the invention of the memory chip was only about thirty years ago, and the digitalisation of telecommunications networks has only begun in earnest in the 1980s.

This rate of advance inevitably puts pressure on companies that are being required in some cases to replace their product lines in three-year cycles, and thus recover their research and capital expenditure in this sort of period.

In telecommunications, one example of this sort of agreement is the collaboration between Alcatel (France), Italtel (Italy), and Plessey (UK). The extent of co-operation is evident in the claim by Olivetti of Italy to have collaborated in about 30 projects.

■ **Government-supported pre-competitive research:**

These kind of projects have emerged in the last few years in an attempt to bring rival companies together under State-financed programmes without undermining the competitive structure of the industry. The idea is to aim for areas where companies can benefit from the joint development of technologies which can then be taken on independently into marketable projects.

The need to cut costs has added impetus for collaboration

Among examples of these sort of programmes are various initiatives in Japan and the Alvey project in the UK, which brought together companies and universities under a Government-funded umbrella.

Even in the US, where joint development work has traditionally been anathema under American anti-trust rules, research collaboration is beginning to take root. The most outstanding example is the Sematech programme, financed jointly by industry and the Government, to develop semiconductor technology.

■ **International research:**

The idea of cross-frontier research co-operation has arisen mainly in Western Europe. It derives from the fragmented nature of the European market and the relative weakness of the region's high technology companies, which typically lag behind their international competitors in the launch of new products or the size of their international business.

Because of these problems, a number of international schemes have been developed to bring together the united resources of the region.

At the same time, governments have been hoping to help break down the nationally-based structures of European industry by supporting projects which brought companies from different countries together.

■ **Joint ventures:**

Companies are increasingly putting competitive businesses together in jointly-held subsidiaries in industries where they feel they need more scale.

These deals are sometimes aimed only at market access. One example of this is the Thorn-Ericsson agreement, under which Thorn in the UK provided the Swedish company with a British base. This allowed Ericsson to tackle the UK market with its digital telephone exchanges until it had achieved sufficient credibility to buy-out its British partner.

Other agreements bring together more equal partners who want to combine their technology and markets, or to achieve more financial muscle to attack new opportunities. The proposed new deal between the General Electric Company of the UK and Siemens of West Germany in the telecommunications area falls into this category, providing both larger markets and an increased technology base to both partners.

Similarly, the 50-50 joint venture between GEC and General Electric of the US in domestic appliances will bring the two companies together for a joint assault on the Continental European market.

■ **Equity participations:**

While equity-based links have been particularly popular in the US - IBM, for example, has often used these sort of transactions, as in its purchase of shares in the Intel semiconductor group - they are beginning to appear more regularly in Europe.

One example is Northern Telecom of Canada's 28 per cent shareholding in STC, the UK electronics and telecommunications group; another is in the field of mobile telecommunications, where several European companies have taken cross shareholdings to give them access to different countries.

■ **Technology alliances:**

Companies are increasingly seeking collaboration in which a partner – usually from overseas – provides either a specific technological skill or a high technology product.

These have been particularly prevalent in the field of computers, where Europeans have drawn extensively on Japanese and US groups. Fujitsu of Japan, for example, provides the basic semiconductor technology for the UK's ICL computer group under a long-term agreement; Fujitsu also supplies mainframe computers to Siemens of West Germany, while Hitachi, another Japanese group, provides mainframes to Comparex, the other leading German mainframe group.

In France, the Bull computer group has a mainframe supply agreement with NEC of Japan; and several European companies have agreements with US minicomputer manufacturers.

The rising popularity of collaboration has not occurred without a great deal of scepticism. Opponents point to the disappointing history of co-operative ventures in the past, arguing that all forms of economic enterprise benefit from clear direction and strong control. Joint activities, they say, suffer from a mixture of objectives and conflicting corporate cultures; and there are questions over how long Governments can concur in behaviour which might easily become anti-competitive.

On the other hand, collaboration has grown out of a real need in some technology areas to share out costs that are beyond the scope of many companies under the present structure of the industry. In Europe, this motivation has been given extra impetus by the division of the industry among national companies serving the old nation states.

On both counts, co-operation may prove to be no more than a stepping stone to a new structure for the industry into larger, more specialised pan-European groups. Collaborative research will have enabled companies to get to know each other better; and the joint ventures will give way to takeovers as technology leaders emerge in different sectors.

This, at least, is how many government officials would like to see the European industry develop: and if it does not, governments may be left with some difficult issues of anti-competitive behaviour on their hands.

Fierce global competition in the pharmaceuticals sector

Rising research costs add strain

THE PHARMACEUTICAL business in Western Europe is now undergoing a series of strains which could affect its position as one of the continent's relatively few unquestionably successful high-tech industries.

The sector, with annual production of about £25bn, is dominated by a dozen or so big companies with operations stretching around the world. These include Glaxo and Imperial Chemical Industries of Britain, Hoechst and Bayer of West Germany, Rhône-Poulenc of France, Switzerland's Sandoz, Ciba-Geigy and Hoffmann-La Roche and Astra and Pharmacia of Sweden.

As executives at these companies regard the future, two big issues – the cost of research and development and the shape of the pan-European strategies that are put in place to control drug sales after the 1992 single market – usually come under crucial discussion. Both are likely to influence the development of the sector over the next decade.

The issue of R&D costs is not a new one for the sector, but it has become increasingly important in recent years as a result of the extra cash that companies have been pouring into this area. Nowadays the big drugs companies normally spend 10-15 per cent of their annual sales on R&D, a much higher fraction than even five years ago.

The need for this has been driven by increased global competition in the pharmaceuticals field and also by the extra trials and therapeutic tests which are required for new drugs by government health authorities before the medicines can go on general sale.

There is a feeling in the drugs sector that not all companies will be able to keep on increasing their spending in this manner. Mr David Friend, chief executive of the drugs division at ICI, says the economic consequences of ramping up spending in this manner in a market place that is becoming increasingly tight are beginning to hit home for some parts of the sector.

"Some companies are beginning to feel the draught," he says.

Mr Peter Woods, a drug industry analyst at Warburg Securities, a London stockbroker, says that at least partly as a result of the extra costs of research he expects to see some thinning down of the top ranks in the pharmaceuticals sector – either by a process of amalgamation or by companies dropping out of the industry – over the next five years.

Extra trials and therapeutic tests are now required for all new drugs

Proof of the way in which companies are flinging money at R&D has come with a plan by BASF, the big German chemicals company, to build a new $40m biotechnology research laboratory in Massachusetts to spearhead its drive into the drugs field - in which BASF is by far from a major player.

A BASF official says:"It is a long-term venture. We don't know what will result. In 10-15 years, we may make a big shot (a research breakthrough) and then we will discuss exactly how to get our ideas on the market. We have no specific plans right now on how we are going to do this."

This somewhat hit and miss approach has been criticised by some analysts such as Mr Stuart Wamsley, a chemicals analyst at the London office of Morgan Stanley, the US investment bank. Mr Wamsley sees this as evidence of the kind of profligate appoach to R&D spending often pointed out by other observers in the drugs field.

Mr Wamsley says: "It is hard to envisage that BASF has enough clout in pharmaceuticals to be able to absorb any ideas which are generated from the big push into biotechnology that it is now making. The idea of creating the new lab is like dropping a big pebble in a pond and waiting to see what ripples come up. It worries me that they are spending all that money without appearing to have a clear idea about what they are aiming at."

Another view, however, comes from Mr Bob Muller, a chemicals industry consultant at SRI International, a California-based consultancy. He says that BASF is right to spend its money on this kind of long-term venture.

He says too much US management thinking is oriented to the short-term – "spending $40m (the cost of the biotech lab) is a first class strategy. I am envious of their (BASF's)attitude."

Irrespective of whether throwing this kind of cash at R&D is a good or bad strategy – and BASF can rightly argue that the answers will only become known at the end of the 1990s – the other big issue for the drugs world is the shape of the pan European licensing and pricing system for medicines after 1992.

Applying the logic of 1992 to pharmaceuticals, the market for these products should be regulated by a common set of standards which would replace the often widely differing rules which apply now in individual EC nations.

In practice, that means integrating at least to some degree the procedures which apply to pricing and licensing of medications in the different countries and which at present differ widely.

Officials at the European Commission in Brussels, in attempting to tackle these areas, are torn by a number of sometimes conflicting requirements. On one hand they want to minimise the cost of paying for drug purchases across the EC countries.

On the other hand, they want to safeguard the health of Europe's big and export-oriented drugs industry. Only by keeping prices relatively high, the sector argues, can the industry afford to finance the high levels of research and development needed to turn out new products.

A third desire by governments is to police the introduction of new medical products reasonably severely in order to prevent problem drugs entering the market which have an unacceptable incidence of side effects. This is where the focus turns to the idea of operating an efficient pan-EC licensing system which stops rogue products by a thorough set of trials procedures, yet at the same time does not prove so cumbersome and bureaucratic that industry suffers too many obstacles in making available safe and effective new products.

Officials at the European Commission still have some way to go in working out a new system which will work across the whole of the European Community after 1992 and satisfy all these issues. The system which is eventually worked out will play a big part in influencing the progress of the industry until the year 2000.

Peter Marsh

Surge in demand for chemicals

Earnings at high levels

THE past year has been *extremely good for many of* Western Europe's big chemicals companies, with revenues and earnings at high levels thanks to the current surging demand for many types of synthetic materials.

The sector is one of Europe's biggest manufacturing industries, with annual sales hovering around £160bn. It contains many of the world's biggest chemicals groups, including the four largest companies ranked by sales – BASF, Bayer and Hoechst of West Germany and Imperial Chemical Industries of Britain.

Yet talk to a typical executive in the industry and you are likely to hear of quite a few problems.

One is the fear that the buoyant state of markets for chemicals products is unlikely to last for more than the next year or two. Many in the industry reckon that a recession of some sort will hit home over this period. That could lead to reduction in sales and lower prices in those of the business selling commodity products such as high-volume plastics and general industrial chemicals which are affected by broad levels of activity in the economy generally.

Another worry concerns the chemical industry's image problem. Many people associate the sector with pollution. They believe – with very little evidence, say many in the sector – that it has not done enough to clean up its act environmentally and to reduce the obtrusive effects of its plants.

Ten years ago, this might not have mattered very much. But an industry that appears to many not to be in tune with today's popular sentiments regarding the environment may indeed have something to worry about.

Technology, however, has something to offer the industry to ease the headaches in both these areas. By moving more of its operations towards the higher-value, high-technology sectors of chemicals, the industry may be able to move away from the commodity areas of the business which are most prone to the sudden peaks and troughs in demand which over the past decade has made planning in the industry notoriously difficult.

In practice, this means continuing the effort – which for many of Europe's big chemicals groups has been going on since the turn of the 1980s – into building up strength in fields such as agrochemicals, pharmaceuticals, engineering plastics and speciality reagents and materials for industrial applications.

Although research and marketing costs may well be higher than for the conventional low-value, high volume products of the chemicals world, all these areas involve selling products at relatively high prices which involve good margins.

Technology, too, may have a part to play in making the industry appear more environmentally friendly. A range of ideas emanating from the chemicals sector itself could help the sector both to clean up its own operations and also to play a bigger part in cutting pollution in other areas of the economy.

Such ideas include computerised plant monitoring systems to provide better control of discharge of wastes; novel enzymes for water treatment; scrubbing devices to get rid of unpleasant gases from power station plumes;and novel kinds of bacteria to clean up contaminated landfill sites.

Europe's annual chemical sales are worth around £160bn

Mr Hugo Lever, director of CEFIC, the Brussels-based trade association for the European chemical industry, says that by developing new ideas related to pollution control the sector may have a positive role to play in environmental matters generally.

Overall, he says, the industry has come a long way since the 1960s in terms of its approach to pollution – "there is a lot of money being spent on environmental matters generally in the industry. We have done a lot to improve our image but have not received a lot of recognition for this," he says.

As for specific sectors, many of Europe's chemicals groups are putting more resources into the research aspects needed to add new properties to basic products such as fibres and plastics in such a way that they can be used in more technical, higher value applications. In this fashion what was yesterday's commodity chemicals can be turned into into tomorrow's speciality materials.

That applies especially to plastics, a £20bn turnover industry in Europe which is increasingly accenting the higher-value engineering plastics component of the sector which is concerned with developing and making high strength materials for industries such as cars, consumer goods and computing equipment.

According to Mr Peter Claus, director of the Brussels-based Association of Plastics Manufacturers in Europe, much of the work in this area lies in developing new blends of materials based on substances which already exist.

The new mixtures, says Mr Claus, may have properties which offer something special to the customer, in terms of factors like toughness or resistance to heat. Leading the thrust in this direction of plastics are several of Europe's large chemicals companies including Bayer and Hoechst of Germany, Akzo and DSM of Holland and Switzerland's Ciba-Geigy. Also trying to strengthen their positions in high-value plastics are the European subsidiaries of three big US groups, General Electric, Du Pont and Dow Chemical.

Peter Marsh

~~research, says David Fishlock, Science Editor~~

New applications in biotechnology

THE EUROPEAN Commission has recently published proposals for harmonising national patent laws by establishing a legal framework for the patenting of genetically-manipulated animals and plants.

Now the EC is drafting guidelines for the regulation of forthcoming experiments in the application of the new biotechnologies to agriculture and food.

Such application have been slower to take off than other applications of biotechnology in pharmaceuticals and health-care, not least because the organisms involved are much more complex than microbes, much less well understood genetically.

Nevertheless, experiments in applying biotechnology to animal husbandry are within sight in Europe. Their broad aim is to improve the health and welfare of farm animals, rather than the creation of novel animals - chimera or monsters, as some critics would have it - says Professor John Beringer, from the medical school of Bristol University. Prof. Beringer is chairman of the planned release sub-committee of the Health and Safety Executive's Advisory Committee on Genetic Manipulation.

A healthier beast - the prevention and reduction of disease in animal husbandry - is the area of greatest opportunity in sight for the so-called "transgenic animal," he believes. These are beasts into which foreign genes have been introduced, just as they have been introduced into micro-organisms for the past 15 years.

Other potential uses foreseen for transgenic animals, however, include the production of veterinary and pharmaceutical products, using the idiosyncrasies of the beast itself as a convenient bio-reactor.

At the Agricultural and Food Research Council's institute of animal physiology and genetics institute in Scotland, transgenic sheep have been used to make a human protein called alpha-1-antitrypsin, a blood-clotting factor, also known as Factor IX.

Factor IX extracted from sheep's milk is expected to be free from any risk of hepatitis or Aids (HIV) infections which may contaminate donated human blood.

Another possible use for the transgenic animal could be as a source of healthier meat for human consumption; meat richer in protein and relatively free from fat, for example.

Professor Mark Williamson of the department of biology at York University has been chairman of a working party convened by Prof. Beringer's committee, to draw up guidelines for the regulation of experiments involving transgenic animals. Whereas biotechnology research practice until now has been able to keep genetically manipulated micro-organisms under tight containment, future agricultural activities must inevitably expect to involve at least some release into the environment at large, if the practice is not to be hobbled to an unacceptable degree.

The broad aim is to improve the welfare of farm animals

Prof. Williamson is also helping the European Community to draw up its guidelines for all 12 nations. At the moment, Britain, he believes, "has the best system in Europe," with guidelines already approved by its Health and Safety Commission, and expected to be backed by new legislation later in the year.

These guidelines define a transgenic animal as one which carries a foreign gene or genes from another species, or an extra copy of a gene from the same species.

Such genes can be implanted in the fertilised egg cell by recombinant DNA technology, and the genetically manipulated egg then placed in the womb of a female animal for development, to spawn the transgenic animal.

The experimental aim, for the foreseeable future at least, is to change a single gene out of several hundred thousand. To put this into better perspective, many genes of an animal, such as a cow, have already been manipulated by nature in its gradual transformation from a wild animal to the contemporary farm animal.

Research centres throughout Europe - a dozen in Britain alone - are planning experiments involving the breeding of transgenic animals of all sizes, from mice to cows. Small animals present no great problems because they can be conveniently contained by similar practices to earlier experiments in genetic manipulation.

Problems begin to arise with farm animals - cows, sheep, pigs and so on - which may need to range more freely. Fish may be very difficult to contain at all.

Agricultural scientists engaged in such experiments in Europe have asked for such guidelines. They have been perturbed by some activities elsewhere, including the case of the arthritic pig, bred accidentally in the US, in an experiment to enhance the growth of pigs. The implanted growth gene ended up in the wrong place, producing a beast that could scarcely stand.

Scientists have also been bothered by accusations from opponents of genetic manipulation - initially in the US, but now increasingly in Europe, especially West Germany - that they deliberately wish to breed monsters in the interest of making farmers richer.

Such critics conjecture monstrosities in which the less economically valuable parts of an animal are simply shrunk or eliminated genetically. Wingless poultry would be an obvious example. They also agonise over the consequences for people of eating animals which have been genetically altered.

So the new guidelines which Britain is pioneering in Europe relate to conditions under which animals might be bred and released to a wider environment. So far, no-one in the UK has gone beyond planting a transgenic potato, in an open field, but under closely specified conditions.

Conditions at which Europe is expected to draw the line - as has Britain - certainly include animals disabled as a result of genetic manipulation, as was the arthritic pig. Any attempt to breed wingless chickens would also be banned.

Under the British guidelines a transgenic animal will have the same 'rights' as any other animal. For its first two generations, a transgenic animal will be regarded as an experimental animal.

EUROPEAN HIGH TECHNOLOGY

More ‘firsts’ in aerospace

AEROSPACE has always been a spearhead industry for high technology, as the ever-increasing demands for higher performances in military and civil aircraft, engines and avionics, and in spacecraft, in turn drive the scientists and engineers to find new materials and new manufacturing techniques to meet those demands at acceptable cost levels.

In military aviation, the overall cost of design, research, development and production of a new fighter aircraft, such as the Anglo-West German-Italian-Spanish European Fighter Aircraft (EFA), can cost many billions of dollars.

Keeping the costs down, whilst ensuring that the overall performance of the aircraft remains superior to that of the enemy fighters, is paramount.

In the EFA, (illustrated with an artist's impression on page one of this survey), extensive use is being made of carbon-fibre composites and new lightweight metal alloys, including aluminium-lithium, while its highly integrated structures use new manufacturing techniques such as superplastic forming and diffusion bonding to save weight and costs.

In its associated engine, the EJ-200, in which Rolls-Royce, Fiat Aviazione of Italy, Motoren und Turbinen Union of West Germany and Sener of Spain are linked, new developments such as single-crystal turbine blades and powder-metallurgy discs will be extensively used, along with a new "integrated health monitoring system" to ensure that malfunctions in the engine can be swiftly detected and corrected.

In commercial aviation, the European Airbus Industrie consortium, comprising British Aerospace, Aerospatiale of France, Messerschmitt-Bolkow-Blohm and Casa of Spain, has been a consistent leader in the development of advanced technology since its 1974, when the A-300 – the first twin-aisle twin-engined airliner – entered service.

Among its significant 'firsts' in airliner technology have been Category III automatic landing, forward-facing two-man cockpits on wide-body aircraft, the use of composite materials in fairings and control-surfaces and 'fly-by-wire' flap and slat controls.

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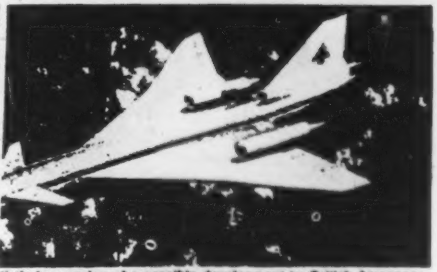


Supersonic business jet: an artist's impression of a possible development by British Aerospace. It would carry 12 passengers at speeds of up to 1,200 mph

The latter has been used in fighter aircraft for some time, but the A-320 twin-engined aircraft is the first airliner to introduce it on the flight-deck, as a means of preventing stalling, or manoeuvring too violently, thereby saving fuel and giving all aboard a smoother ride.

Beyond fly-by-wire, Airbus is now also studying the next technological step involving transmitting information from the flight-deck to the control surfaces of an aircraft through 'fly-by-light,' or the use of a full fibre-optic control system.

Here, the electrical signal-carrying wiring is replaced by optical fibres along which the information is passed, to give improvements in safety, greatly reduced maintenance requirements and systems weight.

Airbus Industrie has also pioneered protection against windshear (violent downdrafts of air), which was introduced on its first aircraft, the A-300, and has been progressively improved ever since, and more recently, Airbus has also led the way with, among other developments, the introduction of a lighter tail-fin in carbon-fibre, a tank in the horizontal tail-plane that saves fuel, and computerised controls.

In the A-320, the safety improvements include not only fly-by-wire controls but also the 'side-stick controllers' which replace the conventional control columns on the flight-deck. Airbus Industrie also was the first to exploit the full potential of TV-type displays on the flight-deck, reducing the number of instruments and creating a more efficient workplace.

Among the latest 'firsts' for Airbus Industrie is the 'common wing' design by British Aerospace that is being used on both the new twin-engined A-330 and four-engined A-340 airliners, now under development.

Hitherto, every new airliner design has been developed with a new wing, but the Airbus/BAe system ensures that two different airliner models can be built for much lower cost by the adoption of the common wing design.

In the overall airliner manufacturing process, Airbus Industrie and its individual industrial partners, are all exploiting new technologies and new materials to speed manufacturing times and significantly reduce costs.

Airbus, for example, believes that by expanding the use of powder-metallurgy the manufacturing costs of metal structures could be reduced by as much as 75 per cent, while automatic riveting could cut them by 50 per cent or more.

By using a system called ARAS (Automated Riveting Assembly System), it is possible for the first time automatically to produce longitudinal joint connections on closed fuselage structures, with drilling, counter-sinking, sealant application, rivet feeding and rivet setting all being done automatically with numerically-controlled machine tools.

Looking into the future, new ventures, such as the Transatmospheric Vehicle which can take-off and land like an aircraft but soar into near-Earth orbit – of which the British Hotol is an example – are now being studied, whilst British Aerospace and Aerospatiale are both looking at concepts for second-generation supersonic airliners to replace the Concorde in the early years of the next century.

In power-plant technology, advanced types of engines are being explored to provide the power for such Transatmospheric Vehicles and new supersonic transports, and those concepts in turn are spawning much research into new materials.

All of these ventures are certain to ensure that aerospace in Western Europe remains where it is today – at the forefront of advanced technology.

Search for new partners sought in the defence industry

Further surprises forecast

EUROPE'S DEFENCE industry has suddenly begun to look like a personal classified advertisement column. The search for new partners, many believe, will yet produce more surprises after the past few months' spectacular series of engagements and proposals.

Three crucial re-organisation moves now awaiting consummation are GEC and Siemens' joint bid for Plessey, the UK's second specialist supplier of military electronics; Daimler-Benz's state-subsidised move towards control of Messerschmitt-Boelkow-Blohm, the West German aerospace group, producing a powerful arms conglomerate ranging from armour to aero-engines and helicopters to aero-engines; and, on a less far-reaching scale, the merger of the flight electronics businesses of the French state-owned groups Thomson-CSF and Aérospatiale.

A wide range of contacts are being conducted between leading UK, French, German and Italian defence contractors, on specific or more long-term arrangements.

Why? Mainly, quite simply, because the market is getting tighter. Curbs on once-expansive US spending have set the tone and the high-technology areas of electronics and new materials stand only partly to buck the austerity trend.

True, the search for efficiency favours some electronic sectors. Activities classed under what is known as CI (command, control, communications and intelligence - more of a military concept than an industrial branch as such) and electronic warfare (the business of confounding enemy signals) can continue to look forward to growth.

But in the giant US market there will be that much more competition for these opportunities, and US companies are looking for ways to tap European markets to compensate for setbacks in their own.

The number of "big players" in the Western defence industry is expected to narrow down. This does not mean that small companies cannot find room as specialised suppliers, but as sub-contractors, a role to which bigger companies are loath to confine themselves.

European companies have made some inroads in the US, such as Plessey with its acquisition of anti-submarine warfare specialist Sippican, and further European takeovers of small US firms are expected. But in defence, foreign-owned companies have a hard task in the protective US military environment, and European suppliers such as Thomson-CSF – which sold its Rita battlefield communications system to the US Army three years ago – always have to share the work with US contractors.

The movement is taking place more within Europe. Under the Single European Act, the Community set out to bring defence matters more within its scope, and there has been talk of building a unified arms market, and even (by the French, to the horror of the UK) of creating a "European preference."

Partly in order to pre-empt moves that might create divisions in Nato, and partly to take advantage of the impetus of the "1992" process, European Nato allies have taken steps to open their military markets to each other. Eventually this could lead to greater specialisation and less wasteful duplication.

Up to now there has not been a European defence industry so much as a collection of ill-assorted national industries. Britain and France, the two countries with by the strongest technological and industrial bases in this sector, provide captive markets for their own suppliers, buying only 10 or 15 per cent from outside, and even less from each other.

The opening of trade is at an early and tentative stage. When it comes to the crunch, what country is ready to let a major defence company go under?

On the other hand, there are ample opportunities for companies to establish Europe-wide outlets – and thereby reach more viable production levels – for components, sub-systems and other items such as munitions.

These moves have been accompanies by a French-led initiative to study the pooling of research resources, following the model of the Eureka and Esprit programmes.

Spiralling research and development costs are the key to current re-thinking in the industry. European contractors have particular strengths in areas such as advanced sensors – not just radar but also infra-red and optical systems – but theirability to keep ahead or keep up is affected by low volume.

Britain's Ministry of Defence, in particular, wants to limit is own input into research, after costly white elephants such as the Nimrod

Continued on facing page

early warning radar project, but industry is reluctant to fill the gap.

The case of a Europe-wide approach at both government and corporate level is gaining currency. Up to now, the response to the problem posed by high investment costs on the one hand and the relative smallness of individual European markets on the other has been co-operative ventures such as the £22bn European Fighter Aircraft (EFA), which four countries are developing.

But collaborative projects have rarely gone smoothly and have almost always brought extra costs and delays, in direct proportion to the number of partners. And beneath the gloss of new-found European co-operation, national sensitivities are never far beneath the surface.

The clearest evidence of this is the trouble that has broken out over the EFA radar, for which a £300m development contract is awaiting a decision by late April.

The sophisticated radar, worth up to £2bn in total if the aircraft goes into full production, is subject to competition, unlike the airframe and the engines, which are being handled by pre-arranged consortia.

The West Germans, who are re-equipping their Phantom fighters with radars by Hughes of the US, back an upgraded version of the same radar, proposed by AEG in conjunction with GEC-Marconi and Italian and Spanish partners.

Britain is strongly behind a Ferranti-designed rival, which, it is argued, represents more modern technology but is also regarded as more risky. Behind this lie other arguments: Bonn's concern about leaving the UK a leading role in all the aircraft's key elements, set against others' concern that use of US technology might lead to interference in prospective EFA exports.

The battle looks like being a bitter one. Major items of defence equipment, which are increasingly becoming integrated systems, are not like new models of TV set, which may fare more or less well on the market.

Either they sell or they do not, and the opportunities do not come around often. Moving away from arrangements whereby governments guarantee the survival of their main suppliers will be, at best, a difficult process.

David White
Defence Correspondent

Peter Marsh looks at new space projects

High ambitions

WESTERN EUROPE is at the cross roads as regards its long-term development of space technologies.

It has agreed to finance a series of highly ambitious projects in manned space schemes to which increasingly large amounts of taxpayers' cash will be devoted over the next decade.

At the same time, it is poised for a steady expansion in the less glamorous – and also less controversial – area of communications and Earth-mapping satellites in which there is a substantial body of involvement by the private sector as opposed to government agencies.

Space developments in Europe, as in most other parts of the world, continue, however, to be largely the preserve of governments.

Most of the cash for these programmes in Europe is provided by the 13-nation European Space Agency, whose budget of about $1.7bn a year is due to increase to roughly $3bn by the mid-1990s.

Other state organisations, such as individual space-technology departments of the governments of countries such as France and West Germany, account for total annual spending of a further $1bn or so.

The cash spent by these bodies is important to a number of big aerospace companies within Europe, many of which are highly dependent on government programmes. Such companies include British Aerospace, Messerschmitt-Bolkow-Blchm of West Germany and Aerospatiale of France.

ESA, which raises its money by subscription from its member governments in rough relation to their size, has three big programmes over the next decade which increasingly will dominate its activities.

These projects involve work on the Columbus space-laboratory module which will plug in to a large manned space station planned by the US for the late 1990s; two Hermes manned space carriers which will look like smaller versions of the US space shuttles and connect up Columbus with ground bases; and the Ariane-5 launch vehicle, a heavy duty system that has grown out of the development of Europe's Ariane rocket series over the past decade and which will act as the main booster stage for Hermes. These three projects are due to cost roughly $13bn by the end of the 1990s.

It has been unmanned space programmes – in areas such as communications satellites, which are now a big area of commerce – which so far have provided most of the business opportunities in space. It is no surprise, therefore, to find ESA's stance towards developing manned space projects come under attack from some quarters.

The criticism has come notably from the UK Government, an important member of ESA and which is the agency's fourth biggest paymaster after France, West Germany and Italy.

The UK has taken the view that many of ESA's programmes in the manned space area are not geared sufficiently to commercial exploitation and are more tied up with arguments of political prestige than with realities of producing useful technologies directed to meet the problems of the late 1990s.

As a result of this approach, Britain has decided not to support the Ariane-5 and Hermes programmes and is becoming involved only to a modest degree in Columbus.

Here its main involvement is in the construction of a Columbus-related satellite which will be loosely attached to the space laboratory but spend all its time in a different orbit taking pictures of the Earth of use in remote sensing. That is a commercially promising area of space technology in which satellite photographs are used in a variety of applications from monitoring crop growth to checking on the spread of pollution.

Arianne rocket: key to business opportunities in space.

Professor Reimar Lüst, director general of ESA, is, however, a vigorous proponent of Europe's aims of directing more of its energies into the manned space arena, a field hitherto dominated by the US and the USSR, the world's two main space powers.

He also thinks ESA should not necessarily be dominated by commercial issues but that it has a role to develop new technologies and scientific thinking in areas where the business applications still have to be thought up.

Prof Lüst, together with many other people connected with space activities, has a vision of the vast areas above the atmosphere being one day suitable for a large number of developments, from making goods in new, zero-gravity factories to space tourism.

In a recent interview, he drew the parallel with what happens on Earth – "in inhospitable places, such as in the mines or in Antarctica, you cannot do without people for many vital jobs. In space, the same will be true. You should try to achieve as much as you can, using automated systems – but it is not possible to say that, in the future, man will not be required in space."

Prof Lüst also went to some lengths to point out the stance by ESA to its relations with the US, with which it is collaborating over the space station but competing heavily in other areas, such as in Ariane developments.

Ariane, which is run by an ESA-linked commercial consortium called Arianespace, is the world's main commercial space launcher and is a rival to a number of other rockets being operated by big US companies such as McDonnell Douglas and General Dynamics.

Prof Lüst says that "this idea of collaboration on one hand and competition on another' is not at all unusual."

Alan Cane on computer industry alliances

An era of mergers

THE CONTRAST with the situation a decade ago could not be more marked.

At that time, major European countries were committed to supporting their leading computer manufacturers as "national champions." Now all that machismo has evaporated and the entire European industry is quietly engaged in a seemingly endless round of discussions as companies seek out the best opportunities for mergers, joint ventures and collaboration in research and development.

While some important deals have already been struck, most activity so far has been confined to exploratory talks; the impression remains that sometime in the next few years, the face of the European industry will change rapidly and decisively. Received wisdom is that there will be a powerful coalescence into a small number of large, well-capitalised groups able to compete both across Europe and globally. Among the causal factors are:

■ The realisation that no single company can hope to excel across the whole spectrum of computing and telecommunications. An example of this is the decision of International Business Machines, the world's largest computer company, to relinquish the manufacturing activities of Rolm, its telecommunications subsidiary to Siemens of West Germany.

■ The need to find new economies of scale as margins are progressively eroded and competition intensifies. Comparex, the mainframe computer company established jointly by Siemens and BASF, is an excellent example. It has recently signed a letter of intent to purchase the European operations of National Advanced Systems.

Both companies market the same mainframe processors, built by Hitachi of Japan.

Mr Rolf Brillinger, Comparex chairman said recently: "Growth rates since the boom period from 1965 to 1985 have obviously settled at a lower level, but are still considerable in comparison to other industries. So it is not surprising that competition has intensified which has brought increasing pressure to bear on costs. The opportunity to rationalise our costs is one of the main reasons for our proposed acquisition".

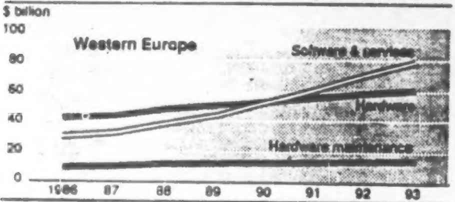
■ The steady move towards common computing standards with Unix as the common operating system of choice and Open Systems Interconnection (OSI) as the choice for networking. It was the European electronics companies led by Siemens, International Computers of the UK and Groupe Bull of France which initiated pressure for world-wide standards.

Now they are seeing their efforts rewarded. But it has been a long battle. Only in the past year has it really become certain that Unix could become a genuine force in the industry, and even so there is an intense battle between two groups, one led by IBM the other AT&T to set the Unix standard.

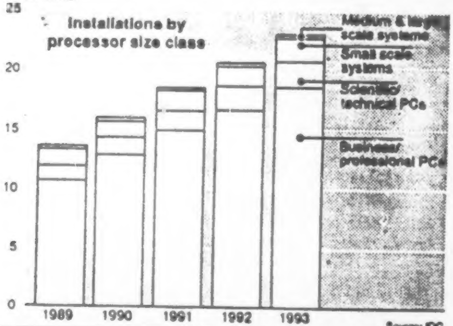
■ 1992 and the advent of the single European market is beginning to concentrate minds wonderfully. Surveys have tended to show that many information technology (IT) companies, especially in the UK, have a jaundiced view of 1992

Romtec, a UK-based marketing consultancy which carried out a study of the opportunities for IT vendors in the single market warns: "It seems likely that the upheaval in Europe will result as much from global issues, such as the major USA, Japanese and European power blocs as from political decisions to remove trade barriers. For IT, this means that it is

Information Technology expenditure



European computers



Source: IDC

more about changed attitudes and changing technology than changes in legislation".

"For this reason, it is dangerous to look at 1992 purely from the point of view of the specific changes in legislation. Companies that have done this have come to the conclusion that 1992 is not very important to them. This is a dangerous assumption".

■ Finally, the cost of research and development in electronics has now become so prohibitive that companies are eagerly seeking to share the burden at least in the area of "pre-competitive" research where companies can combine their expertise to probe fundamental questions of physics.

Siemens, ICL and Groupe Bull, for example, have established a joint research initiative. The European Community programmes Esprit and Race, detailed elsewhere in this survey, are further examples.

With all these difficulties to surmount, does Europe really need an indigenous computer industry?

After all, as one computer manufacturer pointed out, the Europeans had missed their chance. Not one of them was playing an important role in the world-wide industry. They were all on the defensive.

The answer, however, is tied up with the fact that increasingly, computer hardware is becoming standardised, a commodity item, where margins are low and where there is intense price competition. In such circumstances, it may prove impossible to defeat the economics of manufacturing in the Pacific Rim countries.

Matching hardware and software to a customer's requirements, however, is complex especially where the customer is looking for a competitive advantage from new information systems. Solutions are rarely found off-the-shelf and are usually profoundly influenced by local conditions and culture. The Japanese seem to have taken the decision that, for the moment, they are content to stay clear of these complexities.

Hitachi, for example which now has three channels into the West via NAS in the US, Comparex in Europe and Olivetti specifically in Italy seems happy simply to supply machines leaving the tricky job of systems integration to its distributors.

The same seems to be true of NEC which supplies mainframes to Groupe Bull both in Europe and the US and Fujitsu which supplies entire computers to Siemens and specially designed processor chips to ICL. But if all the European computer companies depend on the Japanese for mainframe technology, the same is not true of the critically important mid-range and microcomputer areas.

Competition intensifies in the consumer electronics sector, says **Paul Taylor**

Another battleground ahead

WHILE CONSOLIDATION has continued in the European consumer electronics industry, the European Community has begun taking a tougher line on "dumped" products from Asian producers. But the future of the industry – and the next competitive battleground – lies in the emerging market for the next generation of digital high performance equipment, including high definition television.

As competition has grown, a small group of European multinationals still committed to the consumer electronics marketplace have emerged. These include Philips of the Netherlands, Thomson of France and the fast-growing Nokia group of Finland. They see their future dependant not only on the growth of the West European market as 1992 approaches, but also on being able to compete in the global marketplace.

Thus, the past two years has witnessed a new round of acquisitions and consolidation as the major players jostle for position. Thomson, the French nationalised electronics company, bought Britain's top television producer, Thorn EMI's Ferguson and then acquired the RCA consumer electronics division of General Electric of the US in 1987.

Meanwhile, Nokia, one of Finland's biggest companies – which until a decade was ago was a traditional cable, paper and rubber products manufacturer – has diversified rapidly acquiring the television division of West Germany's Standard Elektrik Lorenz, a subsidiary of Alcatel and formerly part of ITT to add to its earlier consumer electronics acquisitions.

Nokia is now the third largest television manufacturer in Europe behind Philips and Thomson which account for about half of West European television production.

But the figures do disguise some anomalies. A surge of cheap imports in the small screen colour television segment of the market, particularly from manufacturers in South Korea, Singapore, Hong Kong and China, has prompted an anti-dumping investigation by the European Commission. Meanwhile, Japanese and other East Asian groups have been expanding their EC consumer electronics manufacturing operations, particularly in the Britain.

Similarly, smaller European groups which have until now relied mainly on importing finished products or components from East Asia, are re-examining their operations. For example, Hinari, the Scottish consumer electronics group, which claims 10 per cent of the UK market for 14-inch sets and which has so far imported all its products from East Asia, announced earlier this month that it is to assemble 14-inch televisions at Cumbernauld near Glasgow from next month.

Hinari originally intended to manufacture video recorders at the Cumbernauld plant. That plan was dropped when it emerged that they were not threatened by anti-dumping action. But not all video-cassette recorder (VCR) imports have escaped EC action. Last month the Community accepted price undertakings from four out of five South Korean and Japanese VCR producers but imposed duties on Orion of Japan.

Both kinds of penalty will have the impact of raising the prices in the EC's £1.1bn market for VCRs where 7m units were sold last year, compared to 5.8m in 1984.

But while these protectionist measures may give the big European manufacturers some breathing space, they are essentially backward-looking moves. The next great battle, that for market dominance in the emerging markets for advanced television is still to be waged.

Thomson's purchase of General Electric's consumer electronics division not only gave it a major US presence with the GE and RCA brands – it also provided access to to GE and RCA's advanced technology in consumer electronics.

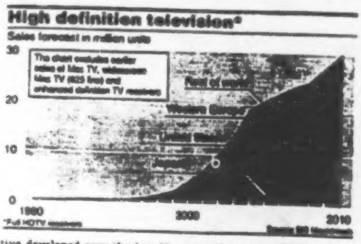
In particular, it gave Thompson access to the work GE/RCA Consumer Electronics had already done on the next generation of television technology, called high-definition television.

HDTV offers the prospect of doubling, or more than doubling, the number of lines across the screen that make up a TV picture, and thereby offering cinema style picture-quality viewing on a wider home TV receiver.

Emerging European and US proposals for HDTV are in response to a Japanese alternative developed over the last 20 years by NHK, the Japanese state broadcasting group. The Japanese system is based on a new television transmission standard, the MUSE (Multiple Sub-Nyquist Sampling Encoding) System.

High definition television*

Sales forecast in million units



*Full HDTV receivers

Source: BIS Mackintosh

The main disadvantage of MUSE, as perceived by the European broadcasting and manufacturing industries, is that it would make all existing television sets, broadcast and production systems obsolete.

While the Japanese system is due to reach the marketplace in the next couple of years – with full-scale high definition broadcasts due to begin in Japan next year, well ahead of its rivals – the Europeans are banking on the attractions of adopting an evolutionary approach that would protect investments in television sets, broadcast and production equipment.

A global race is on to develop advanced televison standards

The European initiative, based on the rival MAC (multiplexed Analogue Components) transmission system, would allow new wide-screen sets, as well as the the millions of existing sets already in use, to receive future high definition transmissions, although older sets would not benefit from the sharper image.

The concept of an upward evolutionary path towards full HDTV has been enshrined in the work of the 30 broadcasting and equipment manufacturers, including Philips, Thomson and Bosch groups who are co-operating on an HDTV project under the auspices of Eureka, the European programme for co-operation in high technology.

The Eureka HDTV programme is aimed at developing a new European television standard for the 1990s. The first public showing of the new system took place at the International Broadcasting Convention in Brighton, last September.

The global race now under way to develop new advanced television standards is more than a matter of national pride. The shift from analog to digital technology in television sets, hi-fi equipment, home automation and other personal entertainment markets, is accelerating.

Digitally-enhanced video cassette recorders are coming as are gadgets for managing the home. The CD video has already arrived in Japan, the US and now Europe, although sales are currently depressed by a lack of software.

By 1991, the value added to the world wide consumer electronics market by digital products and components will probably amount to $10bn, according to some estimates. The US Commerce Department has estimated that by 2000, the world market for HDTV alone will grow to $40bn, with about half that in the US.

But there is another reason why Europe, and now the US, is concerned not to be left behind by the Japanese again. HDTV requires massive investment in semiconductor and other technologies and these technology and expertise have important applications in other spheres including computers and defence electronics.

It is this concern about the erosion of both technologica leadership and competitivenes which is primarily behind th current scramble in the US t define its own HDTV project.

It is increasingly likely tha consumers will, once agai face the prospect that HDTV like its lower definition predecessor, spawns three differen non-compatible standards operating on the world's two main standards, 50Hz and 60H.

This was made more likel last autumn when the US Federal Communications Commission set out its plans for a HDTV standard, different fro both those in Japan an Europe.

Nevertheless, by the yea 2000, BIS Mackintosh predict there will be 10.8m full HDT receivers in the world, rising t 207.6m, ten years later.

Ahead of the surge in HDT sales, BIS predicts an intermediate growth phase o advanced television equipmen such as MAC TV, wide-scree MAC TV and so-called EDT (enhanced definition telev sion) receivers, all offerin improved picture quality.

By the mid-1990s, it is probable that a quarter of homes i some leading markets wi have 'improved-definition' tel vision.

This process could be acce erated in Europe by the adver of direct broadcast satellit transmission, particularly th launch in September of Britis Satellite Broadcasting's three channel service.

Unlike Mr Rupert Murdoch already-launched Sky servic which uses the PAL televisio standard, BSB – a consortium whose shareholders includ Bond Corporation of Australia Granada and Pearson, owner o the Financial Times – will b using the MAC standard offe ing those, with the right equipment, digital stereo sound an television pictures with 50 pe cent more detail than at pres ent.

As Mr Peter Groenenboom managing director of consume electronics at Philips International acknowledged whe Philips agreed last month t make 1m television decoder for BSB, MAC is "the engine o the future."

Mr Bob Whitkin, executiv director of BIS Mackintosh adds: "BSB's success is important for MAC and therefor HDTV . . . if BSB does no succeed it would push bac advanced television."

Computing services companies

The bigger the better?

THE QUEST for size is being pursued vigorously among European computing services companies, worried that they may be beaten to the punch by their larger, better-capitalised US competitors.

Computing services is an important but ill-defined part of the European high technology scene. It includes software houses, consultancies, computer bureaux, and recruitment and training companies. More recently, computer leasing, maintenance and disaster-recovery organisations, traditionally outside the computing services arena, have been staking claims to a share of the market.

Most senior executives in the computing services business believe that within a few years, the services sector will be dominanted by a small number of very large companies. At present, the sector is distinguished by the presence of a large number of small companies, not one of which has a significant market share.

Mr Jerry Jerram, finance director of SD-Scicon, a UK-based computing services company, says: "The choice is to be one of 'the three F's' – a Ford, a Ferrari or a failure".

SD-Scicon is set on becoming a Ford of the computing services industry. Formed just over a year ago from the software house Systems Designers and the computing services company, Scicon, which belonged to British Petroleum, the company has spent most of the past 12 months going through the painful process of consolidation – successfully, it seems.

Mr Philip Swinstead, company chairman, says; "The very nature of the company has changed over the years. We are no longer a software house; we have become a systems integrator".

To be fair, to become a systems integrator, bringing together the most suitable hardware and software to suit a customer's needs, is the aims of virtually every company in the electronics sector now that margins on packaged software have been cut to the bone and hardware has become a commodity item.

SD-Scicon, however, is these days quite unlike a conventional software house – it carries out little contract programming ("body shopping"), for example, and so has very few programmers among its staff.

Systems integrators need to be big for several reasons; they have to have a good financial track record to convince their customers that they can tackle the role of prime contractor in as major assignment. They have to have a mix of skills, both technical and industrial, to be able to tackle a wide range of commercial projects. They also have to be large enough to absorb the costs and tribulations of a project going wrong.

And software projects do go wrong. Despite all the efforts of specialists in software engineering to improve the reliability of systems, there is always the possibility that a tender price will prove hopelessly optimistic.

The outstanding example of size in the European computing services industry is CAP-Gemini-Sogeti of France, which over the years has grown powerfully through acquisition both in Europe and the US.

European companies are worried by US competitors

It has a 20 per cent stake in Sema Group, the pan-European company formed through the merger of Sema-Metra of France and CAP Group of the UK, and has made no secret of its ambitions to acquire the Anglo-French systems house with a view to forming the first of the European giant systems integration companies.

It would, however, be a hostile takeover and as some 62 per cent of Sema's shares remain in friendly hands, chiefly Paribas and CIN of France, unlikely to be accomplished in the near future.

The fear is, however, that several of the larger European systems companies could be a prime target for acquisition by US computing services companies anxious to buy a stake in Europe before 1992 and the advent of the single European market.

Electronic Data Services (EDS), a subsidiary of General Motors, made a bid in the early 1980s for the UK systems house Logica, then in trouble through a poor financial performance in the US and in office systems. That bid was denied on political grounds.

Logica remains, however, a prime target for acquisition.

UK companies have been setting the pace in the US, however. According to organisations monitoring takeovers and mergers, activity in the UK computing services industry hit a record high in 1988.

Broadview Associates of New York, for example, estimated that it rose by 38 per cent over 1987. Overall acquisition activity has grown at a compound rate of 46 per cent over the past three years, Broadview said. Mr Keith Harpham, a director of Broadview's London division, described the activity as "feverish."

"In 1988, Britain spent over £1.09bn in acquisitions in the US. This represents a sterling value equal [illegible] many times that which t[illegible] invested in continental [illegible] despite the excitement over 1992."

A new development in the past two years has been the emergence of computer leasing companies aiming to become full-line computing services companies, based on their extensive lists of blue chip customers.

The "Ferraris" of the industry seem to have a profitable future, even if their ultimate fate is to be swallowed by one of the larger groupings. Examples include Systematica, a tiny company, based in Bournemouth, which has just signed a contract to supply software engineering tools to the European Space Agency.

The company, which will turn over only about £2.5m this year, secured a Europe-wide agreement last year with Digital Equipment, the world's second largest computer company, to supply its software on DEC's scientific workstations.

Mr Swinstead of SD/Scicon agrees that innovation within his company has dwindled as it moves from being technology-driven to a professional engineering enterprise. No matter how large the CGSs, Sema Groups, SD-Scicons or Logicas of Europe become, there will always be a need and a future for the small, inventive software house, willing to pursue a good idea to a profitable conclusion.

Alan Cane

EUROPEAN HIGH TECHNOLOGY

Semiconductor production

A glaring weakness

ONE OF the glaring weaknesses of the domestically-based European electronics industry lies in semiconductor technology.

Ever since the invention of silicon-based memory chips in California 30 years ago, home-grown European companies have struggled to establish a place for themselves in world markets. They have failed to match either the inventive dynamism of the American companies or the scale of investment of the Japanese manufacturers.

As a result, European production is outstripped by the Japanese and American industries, while the larger indigenous European companies lag well behind their overseas competitors in size. European manufacturing is also highly dependent on foreign-owned producers, mainly US companies, but increasingly Japanese, which account for about half of the sales of the region.

Does this matter? There is a school of argument, strongly supported in the UK, which says that semiconductor technology is so expensive to maintain that European companies operating in their highly fragmented regional market cannot afford to be in the race.

The key issue, according to this argument, is for electronic equipment manufacturers to have easy access to the latest chip designs to incorporate into their equipment – television sets, computers, toys, washing machines, military radar and the like.

Opponents of this view contend that semiconductors are an essential enabling technology. Knowledge of the latest chip devices, they say, helps equipment companies to stay ahead of the competition in their own industries.

Indeed, the American dominance of computer manufacturing and the Japanese success in consumer electronics are often ascribed to their skills in semiconductor technology: chip manufacturing in these countries combines in a virtuous circle with equipment production to create a strong electronics industry as a whole.

Whatever the validity of these arguments, the fact is that European companies are under severe pressure in their local market. In 1988, seven out of the top ten chip companies selling semiconductors in Europe were foreign, and five of these had substantial production facilities in the region. Half of the following ten companies were also foreign - and included, in the Japanese and South Koreans, some of the fastest growing groups in the industry.

The response to this pressure from overseas has produced a mixture of political and industrial initiatives.

First of all, European Governments have tried to foster their domestic industries behind protective tariffs. Under the European Community trading regulations this now stands at 14 per cent, a figure which is sufficiently burdensome to have persuaded several foreign companies to increase their production in Europe, particularly when they build their businesses up to a significant volume.

Some argue that Europe cannot afford to enter the expensive semiconductor race

In the last two years, this policy has been reinforced by stronger action on fair trading grounds. One of these moves has involved anti-dumping action against Japanese companies for a range of memory chip products – an inquiry which still has to be resolved.

More recently, the European Commission has ruled that chips qualifying as made in Europe have to go through the elaborate "diffusion" process in the region. This will put pressure on Japanese companies to invest in plants in Europe because many chip users need to buy locally-manufactured components to avoid anti-dumping duties.

Second, there has been a series of Government-backed initiatives aimed both at strengthening European research and development and improving the production capability of the industry.

- SGS in Italy and Thomson in France, two companies that have now formally merged their chip activities, are working on electronically programmable memories under funding provided by Eureka, the bi-lateral device for inter-State collaborative research ventures.
- Philips of the Netherlands and Siemens in West Germany are now at the end of the Megaproject, designed to bring them up to date in the field of static and dynamic random access memory chips.
- A much broader initiative growing out of the Megaproject is now getting under way to help European companies develop the manufacturing technology for the next generation of chips. Called the Joint European Semiconductor Silicon (JESSI) project, this is headed by three main companies – Philips, Siemens and ST (the former SGS-Thomson group), but will also include a number of other chip manufacturers.

Apart from its importance in the semiconductor field, JESSI promises to be an important catalyst in the development of European thinking about high technology research in general.

It is a very large programme, which may cost a total of around ECU4bn – much more than any other individual programme outside the special case of the nuclear industry. It is also bringing together both producers and users in a move aimed at making research more market oriented. And it may well lead to an innovative linkage between research funded by the European Community and projects financed by individual Governments.

- The rate of rationalisation and streamlining in the European industry has also accelerated in the last few years.

The most far-reaching of these moves has been the creation through merger of the Italian-French ST group, which has become the second largest producer in the region after Philips.

ST is currently planning to establish a further European base in the UK with the purchase of a controlling interest in Inmos, the specialist transputer manufacturer owned by Thorn EMI.

Another shake-out has occurred in the domestic UK industry with the acquisition of Ferranti's components division by Plessey. Although Plessey is still not large enough after this deal to move into Europe's top ten semiconductor groups, the company has become one of the region's largest specialist producers of semi-custom chips.

Terry Dodsworth

TELECOMMUNICATIONS

Big test begins

WITHIN THE next few months, the massive restructuring that has swept the European telecommunications scene in recent years, should be almost finished.

Whether this restructuring will be successful in injecting a new commercialism into the industry remains to be seen. What is clear, however, is that the region's industry will have consolidated itself into two and possibly three large companies, which should be capable of funding research into the next generation of public telecommunications products.

The pressure on research budgets is probably the most significant factor behind the industry's concentration. As telecommunications products – particularly the computerised exchanges that are at the heart of modern networks – have become more and more sophisticated, the cost of developing each successive generation has shot up.

A few years ago, the European telecommunications industry was fragmented. Each country had its national champions, but many of these had little business outside their borders. This led to fears that their sales would not be large enough to justify the upgrading of their products, which in turn has been the spur behind the restructuring.

The five most important events in this process have been:

■ The merger of ITT of US's telecommunications interests with Alcatel of France in 1987 to create a company with $11bn of telecommunications sales.

■ The takeover of CGCT of France by Ericsson of Sweden in 1987.

■ The formation of GPT in 1988 by merging the telecommunications interests of GEC and Plessey, both of the UK.

■ The joint bid by GEC and Siemens of West Germany for Plessey late last year. If this bid – which is now under investigation by the UK's Monopolies and Mergers Commission – proceeds, Siemens will take a 40 per cent stake in GPT, creating the world's third largest telecommunications grouping after AT&T of the US and Alcatel.

If the bid does not go ahead, it is highly unlikely that GPT will remain independent, with the most likely options being a partnership with either AT&T or Siemens.

■ The proposed deal between AT&T and Italtel, Italy's principal telecommunications manufacturer: the precise details of this deal are still being negotiated, but it would put Italtel firmly in the AT&T camp.

The upshot of all this activity will mean that shortly there will be very little of Europe's telecommunications industry that is not tied to one or other of the large international groupings.

A few questions still remain on the restructuring front. First, will Ericsson – the smallest of major European players – be large enough to survive without some further link-up?

Second, will STC of the UK, which is no longer in mainstream switching business, be able to continue with its successful strategy of concentrating on transmission systems and intelligent networks?

The question here concerns mainly how the relationship between STC and its 27 per cent shareholder, Northern Telecom of Canada, develops – a relationship which both companies insist is working well. In the long run, however, the focus will be on whether the newly-created European giants will be able to respond to market opportunities in a way that their predecessors were often unable to. Four questions stand out.

The pressure of research costs has encouraged the industry's concentration

■ Will the European Commission's Green Paper on liberalising telecommunications succeed in injecting dynamism into the market?

One of the key considerations will be whether the internal barriers on public procurement really come down, or whether national telephone operators continue to stick with their preferred suppliers. Advocates of the Green Paper argue that, if companies are forced to compete for business in Europe, they will drive down costs so enabling them to win export business.

■ How innovative will the telephone operators be in modernising their networks?

In the area of transmission systems – particularly opto-electronic products such as programmable digital multiplexers – European companies are at the forefront of technological developments. However, to maintain this lead, they will need to find more markets for their products which would allow them to drive down their costs.

An important influence on the speed of modernising these networks is likely to be whether telephone operators are allowed to offer television services over their networks.

■ Will the telecommunications manufacturers be successful in penetrating new markets behind the iron curtain and in maintaining their strong position in the third world – both parts of the world where expenditure on telecommunications products is expected to increase rapidly in coming years?

The most significant development on this front is the news that Alcatel is close to signing a deal to supply large quantities of digital exchanges to the Soviet Union.

Hugo Dixon

Lively market for mobile communications

Entering a new arena

ONE OF the liveliest of the high-technology markets is mobile communications. However, behind the image of the yuppie making calls from his or her car phone, is a dramatic change in technology and lifestyles that is rapidly moving mobile communications out of the preserve of the few and into the mass-market arena.

Many of the new ideas in European mobile communications have been generated in Britain, where the Government has been pursuing a policy of liberalising telecommunications for several years and has seized on mobile communications as a priority area.

In giving the go-ahead for the UK cellular system in the mid-1980s, the Government took two decisions, which are being credited for the disproportionate success of the UK market compared with that in most other European countries, apart from Scandinavia.

First, it awarded a licence to Racal Telecom, as well as to the established telephone operator, British Telecom. Second, it said cellular operators would not be allowed to sell their services direct to customers, but would have to use intermediaries.

The result has been the creation of an industry of entrepreneurs, competing vigorously against each other sell cellular services. The system has been so successful that Racal Telecom, a company that is only four years old, is now capitalised on the stock market at about £3bn.

Several other European countries are now following the UK pattern. France has already chosen Cofira, a private-sector company in which Racal Telecom has a small stake, as a second competitor to France Telecom.

West Germany is due to choose a competitor in cellular telecommunications to the Bundespost later this year. The battle for this second licence is already developing into an interesting fight. Those entering the fray include major German industrial companies such as Daimler Benz and BMW, European telecommunications operators such as BT, Cofira and Racal Telecom, and several of the US 'Baby Bell' telecommunications operators.

Meanwhile, 13 European countries have joined together to agree a common standard for the next generation cellular system – the pan-European digital network. This will allow people to drive from Stockholm to Naples using the same car phone and is due to start coming into operation from 1991.

The pan-European network will also create a single market for cellular equipment, which is expected to be valued at around £700m a year in the mid-1990s. This should help European manufacturers such as Siemens of West Germany, Alcatel of France and Ericsson of Sweden build up sufficient economies of scale to compete on the world market, particularly because Europe is pioneering this technology.

Non-European companies will not, however, be kept out of the market. Motorola of the US, for example, has already been successful in winning contracts to provide the infrastructure for the new network, while Japanese manufacturers are expected to prove strong competitors in the market for the handsets.

Nevertheless, much of the impetus for new ideas in the mobile area will probably continue to come from the UK. Three particular ideas stand out:

■ First, telepoint. In January, the UK Government licensed four consortia to operate a new portable phone service, called telepoint. The technology for this service was developed in the UK and its exploitation is being pioneered there. It will allow people to make outgoing phone calls when they are within a hundred yards of a radio base station, thousands of which will be set up in prime locations around the country.

In many ways, telepoint is more limited than cellular communications. People have to find a base station to make a call and they cannot receive calls. Set against this, however, is the fact that the system will be much cheaper to use and the handsets will be small enough for people to put them into their pockets.

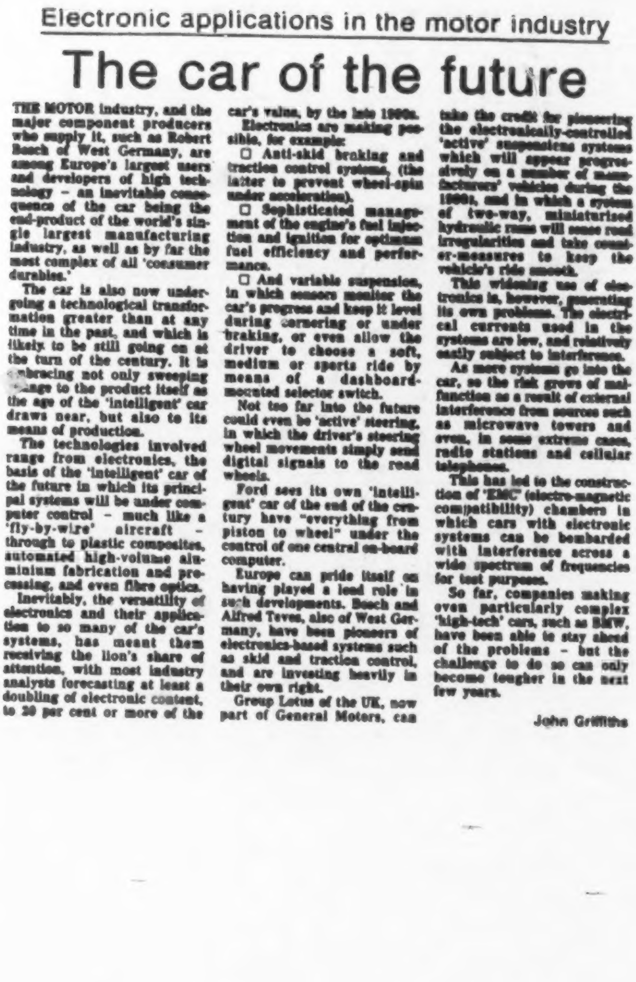
Other European countries – as well as the US and Japan – are now watching the UK experiment with interest. Fo example, France Telecom which has a minority stake i one of the UK licences, is kee to move ahead with a networ in France.

■ The second new concep that has come out of the UK is "personal communications". This is envisaged as somethin of a cross between cellular and telepoint. People would be able to receive as well as mak phone calls and, within urba areas, would not have to hun around for a base station.

■ The third idea bein worked on in the UK is to auction-off the radio spectrum t the highest bidder, rather tha allocating it on the presen bureaucratic basis. The Depar ment of Trade and Industry i aiming to bring out proposal to move to such an auctionin system this summer.

Auctioning-off the radi spectrum could have profoun implications for the furthe development of mobile comm nications, as one of the mai constraints on the introductio of new services has been th lack of air waves to transm the services over.

Hugo Dixo



Electronic applications in the motor industry

The car of the future

THE MOTOR industry, and the major component producers who supply it, such as Robert Bosch of West Germany, are among Europe's largest users and developers of high technology – an inevitable consequence of the car being the end-product of the world's single largest manufacturing industry, as well as by far the most complex of all 'consumer durables.'

The car is also now undergoing a technological transformation greater than at any time in the past, and which is likely to be still going on at the turn of the century. It is embracing not only sweeping change to the product itself as the age of the 'intelligent' car draws near, but also to its means of production.

The technologies involved range from electronics, the basis of the 'intelligent' car of the future in which its principal systems will be under computer control – much like a 'fly-by-wire' aircraft – through to plastic composites, automated high-volume aluminium fabrication and processing, and even fibre optics.

Inevitably, the versatility of electronics and their application to so many of the car's systems, has meant them receiving the lion's share of attention, with most industry analysts forecasting at least a doubling of electronic content, to 20 per cent or more of the car's value, by the late 1990s.

Electronics are making possible, for example:

☐ Anti-skid braking and traction control systems, (the latter to prevent wheel-spin under acceleration).

☐ Sophisticated management of the engine's fuel injection and ignition for optimum fuel efficiency and performance.

☐ And variable suspension, in which sensors monitor the car's progress and keep it level during cornering or under braking, or even allow the driver to choose a soft, medium or sports ride by means of a dashboard-mounted selector switch.

Not too far into the future could even be 'active' steering, in which the driver's steering wheel movements simply send digital signals to the road wheels.

Ford sees its own 'intelligent' car of the end of the century have "everything from piston to wheel" under the control of one central on-board computer.

Europe can pride itself on having played a lead role in such developments. Bosch and Alfred Teves, also of West Germany, have been pioneers of electronics-based systems such as skid and traction control, and are investing heavily in their own right.

Group Lotus of the UK, now part of General Motors, can take the credit for pioneering the electronically-controlled 'active' suspensions systems which will appear progressively on a number of manufacturers' vehicles during the 1990s, and in which a system of two-way, miniaturised hydraulic rams will sense road irregularities and take counter-measures to keep the vehicle's ride smooth.

This widening use of electronics is, however, generating its own problems. The electrical currents used in the systems are low, and relatively easily subject to interference.

As more systems go into the car, so the risk grows of malfunction as a result of external interference from sources such as microwave towers and even, in some extreme cases, radio stations and cellular telephones.

This has led to the construction of 'EMC' (electro-magnetic compatibility) chambers in which cars with electronic systems can be bombarded with interference across a wide spectrum of frequencies for test purposes.

So far, companies making even particularly complex 'high-tech' cars, such as BMW, have been able to stay ahead of the problems – but the challenge to do so can only become tougher in the next few years.

John Griffiths

The quest for advanced materials

Key research area

IT HAS been suggested that advanced materials may be one of the technology pillars of the 21st century, with the greatest advances expected outside of Europe.

This may turn out to be the case, but the technology pillar is more likely to be supporting specialised, high-spending areas of industry, such as defence, where the benefits of exploiting advanced materials are great and unobtainable in any other way, than by providing a technological uplift across the industrial spectrum. That may come later, on the back of the early applications.

Hence, the ability to compete in the rapidly developing sector of advanced materials is likely to be determined in large measure by the scale of a country's defence spending and by the scale of spending in other sectors where the benefits are perceived to be great, such as the electronics and the automotive industries.

These are the areas where advanced materials are likely to find their earliest applications; it is where the money and the motivation lies, where most of the research effort is being directed, especially to meet unprecedented demands for improvements in the performance of military systems, with tighter control of costs as defence budgets get squeezed by increasingly costly demands.

The US has the biggest defence spending in the West and is the world leader in advanced materials. The Northrop Corporation has recently completed the B2 Stealth strategic bomber, made largely of advanced new materials, such as composites and other non-metallic materials to avoid detection by radar.

Such a concentrated programme would be inconceivable elsewhere in the West, and certainly Europe is a long way from providing a coordinated effort to rival that of the US in advanced materials.

The range of potential advanced materials is very great. It includes the broad categories of ceramics; metals, including processing by the "new" metallurgy, where exotic metals can be sprayed, or evaporated molecule by molecule on to surfaces; bionics, where biological processes could be used to produce strong materials and where structural designs in nature could be mimicked with larger scale versions made either from biological materials, such as silk, or from other materials.

There are also prospective further developments in composite materials and polymers.

In the ceramics field, a world market worth $3bn, the industry is fragmented and difficult to define, with much of the fundamental research work being carried out by the ultimate users of the materials.

These include those companies which seek advanced performance for products that have to operate at very high temperatures. These companies are engine manufacturers, especially aero-engine companies.

In Europe, these include Fiat Aviazione of Italy, Motoren und Turbinen Union (MTU) of West Germany, Rolls-Royce of the UK and Snecma of France — all aero-engine makers which are seeking materials to operate at higher temperature.

The potential prizes are enormous, with engine thrusts up to 20 times the weight of an engine possible through the use of high temperature ceramics, compared with thrust to weight ratios of about eight to one for current engines.

The US leads the way in research, but the range of potential new materials remains great

The competition is intense for European companies to develop ceramic materials for use in aero-engines. US companies such as General Electric and Pratt & Whitney are world leaders in aero-engine sales and the European manufacturers have found it necessary to form links with the larger US manufacturers.

Fiat, Rolls-Royce and MTU are partners with Pratt & Whitney in the International Aero

Engbines consortium, which also includes Japanese companies.

Elsewhere in Europe, manufacturers of automotive engines, such as Klockner Humbolt Deutz are working on ceramic materials for their diesel engines.

The apparent predominance of material users in the ceramics research and development field is at the expense of the primary manufacturers of the materials.

The value for silicon when processed into a form suitable for high value added applications, for example, is about 400 times the value of the silicon simply as a material, according to McKinsey, management consultants.

For polyvinylidene fluoride, a polymer, the value in end user applications could be as much as 1,500 times the value of the polymer as a material.

These figures illustrate why user companies seek to keep control of the research on advanced materials and why they act in competition with the material producers, who have little power to develop a monopoly of research.

The composites branch of advanced materials is becoming dominated by chemical multinational companies, according to McKinsey. Of these, European companies such as ICI and BP of the UK, Ciba-Geigy of Switzerland, BASF of West Germany and Shell of The Netherlands are competing with US companies such as American Cynamid.

The total world market is estimated at $1.5bn.

In the polymers sector, again dominated by chemical multinationals, West German companies such as Hoechst, BASF and Bayer and US General Electric have about 70 per cent of the world market worth an estimated $2bn to $5bn, for polymer resins.

In the metals sector, an advanced materials market worth about $5bn, according to McKinsey, there is limited competition on a metal by metal basis.

Of the metals currently being investigated, aluminium lithium potentially is the most interesting of the traditional alloys. The French company, Cegedur Pechiney filed a patent relating to the production of aluminium lithium alloy as far back as 1958.

By 1963, the first casts of aluminium lithium magnesium alloy had been produced. The material is light but stronger than ordinary aluminium, but still not easy to produce and has not yet seen widespread application.

The world market for advanced electronic materials is estimated by McKinsey to be worth between $10bn and $15bn with an annual growth rate of 10 to 15 per cent a year. The industry is still fragmented, but is coming under the control of multi-national chemical companies.

Lynton McLain

EUROPEAN HIGH TECHNOLOGY

Flexible manufacturing systems

Market worth $620m a year

NEW RESEARCH shows that economies of scale no longer feature as the top priority in the plans of much of Europe's manufacturing industry which, by 1991, will be spending $1.9bn a year on flexible manufacturing systems.

Without some means to adapt to the dizzying pace with which new products are brought to market, expensive re-tooling would be required almost incessantly, according to the market research group, Frost and Sullivan.*

"Rapid changes in technology have substantially reduced today's product life cycle," says the study.

The so-called "flexible manufacturing systems" (FMS) strategy uses computer-control of common assembly tools to produce a range of products solely through changes in the instructions which they are given. This provides the ability to quickly change over from work on one batch of products to another, or even on a mixed range of products.

Analysts at Frost and Sullivan say that European industry is now spending $620m a year on FMS, and predicts that this will rise by 33 per cent a year through to 1991.

West Germany has undoubtedly been the leader with some 35 full-scale FMS systems in operation by the end of 1986, mostly in the automotive industry. The country had 31 per cent of the 1987 European market, valued at $200m.

Britain's share of the European market, which accounted for a fifth in 1987, or $122m (£83m), will decrease, say analysts. The UK machine tool industry is suffering heavily from Japanese competition, while the mechanical engineering sector has performed poorly recently - 1986 output was below the 1980 level - and, in terms of robots, the UK has fallen behind its former pre-eminent position.

France now has 18 per cent of the European market - worth $113m in 1987 - and the highest growth rate at 42 per cent a year.

A survey of around 60 manufacturing companies, undertaken by CMG Management Consultancy to establish what the general reaction was to computer integrated manufacturing (CIM) and factory automation, primarily in the UK, supports the somewhat gloomy picture painted by Frost and Sullivan.

"Many of them felt that they had automated for the sake of automation and that there had probably been an over-investment," says Mr Frank Burridge at CMG Management Consultancy.

"Two or three of them felt that they were achieving the true success that they had planned. As for the rest, the reason for their lack of success was that they did not evaluate the organisational implications properly."

Customer-service economy and quality are the main issues facing manufacturing companies, and they need to be addressed first before CIM is taken on board. The philosophy of many manufacturing companies in the past has been "let us make what we can sell," whereas today it is "let us sell what we can make."

Manufacturing companies have to set competitive delivery lead times and the first factor that must be recognised is that marketing should "lead" manufacturing, says Mr Burridge. This requires a process of evaluation and analysis which defines competitive delivery lead-times against product lines.

Thereafter, they are better able to identify what products should be manufactured to feed those markets. Only then should they look at the level of technology being utilised within the production environment, he suggests.

"In some instances, it may even mean that they have to get rid of some of the trivial technology they currently use within their plants. They may be better-off moving it outside and subcontracting for these services, for example."

Quality, at one time the driving force of manufacturing industry, is often taking second place to customer service. The order now is: right product, right time, right quality, right price.

Logistics management and just-in-time (JIT) scheduling are the tools of the new order. The Austin Rover Group (ARG), for example, has apparently made savings of £[illegible]m a year since it launched its JIT or "minimal inventory" programme.

West Germany leads the way in the use of these systems

These disciplines help companies to evaluate what they are achieving, not only on the demand side, but also on how they control their supply chain.

In Europe, [illegible] will usher in an era of increasing competition and alliances – and one trend among of manufactures in the future will be "co-makership" – co-operative ventures with suppliers to share profits and to increase turnaround. Standards like Manufacturing Automation Protocol (MAP) will facilitate this process, but standards-making is always an emotionally-charged affair.

"My experience in the US tells me that a lot of companies are now getting hurt as a result of moving into MAP," says Mr Burridge.

General Motors, the main proponent for MAP and Ungermann-Bass, a leading supplier of local area networks (LANs) which form a major component of factory automation, has apparently fallen out with the latter's announcement, last October, that it would stop supporting the MAP-specified token-bus LAN because a stable market has not materialised.

The software house, Logica, sees a slow UK uptake for MAP in part because alternatives are available, and users are unaware of its benefits.

Mike Clark, principal consultant at Logica Energy and Industry Systems, anticipates that solutions for CIM will become increasingly heterogeneous in that no single supplier will supply the entire system. That puts pressure on manufacturers to adopt standards – but standards seem to move along erratically and, in the meantime, manufacturers adopt piecemeal solutions.

*"*Flexible Manufacturing Systems and Assembly in Europe," from Frost and Sullivan, 4 Grosvenor Gardens, London, SW1W 0DH.*

Boris Sedacca

ESPRIT Update

by J.F. Blackburn.

The first 5-year phase of the European Strategic Program for Research and Development in Information Technology (ESPRIT) ends in February 1989. Reports on the program have appeared in a number of articles in European Science Notes (ESN 38-2:69-71[1984]; ESN 38-5:248-252[1984]; ESN 40-11/12:411-414[1986]). This report summarizes some of the achievements of ESPRIT I – the first 5-year phase – and gives a preview of plans for ESPRIT II – the second 5-year phase, which follows immediately after ESPRIT I.

During the 5 years since ESPRIT began, the information technology (IT) industry in Europe has expanded through cooperation in research and development, forming joint ventures and leading to restructuring within the industry. Also, Europe has played a role in developing world data processing organizations like X-Open, SPAG, and OSI. The industry is moving from proprietary systems toward open systems.

From 1984 to 1987 European IT companies have grown from a total turnover of 35.1 billion ECU (European Currency Units) to 48.9 billion ECU (about $56 billion).

Some of the direct results of ESPRIT projects include:

- 27 have contributed directly to products or services currently available on the market
- 44 have contributed directly to the products or services being developed for the market
- 44 are being used outside the ESPRIT program, either within the company concerned or in another company
- 28 have contributed to standardization, either adopted as an international standard or being elaborated by an international standards organization working party.

Some examples of successful projects are:

- BICMOS (a high-performance CMOS-BIPOLAR process for VLSI circuits). This project has developed a VLSI technology which combines, on a single chip, MOS circuitry of the highest available density with bipolar circuitry of similar density, but better suited to such specific tasks as the analog interfacing with the external environment.
- Supernode (Development and Application of a low-cost high-performance multiprocessor machine). A high-performance, multiprocessor prototype computer with flexible architecture has been developed and built. It is suitable for a wide range of science and engineering problems. Twenty such machines have been installed and a further 20 are on order. Performance ranges from 25 Mflops to 400 Mflops. The plan is to have systems up to 1.5 Gflops by sometime in 1989. Prices range from $60,000 up to $600,000.
- Integrated Sensor-Based Robot System. This project has developed an advanced tactile and vision sensor system. This includes a sensorized gripper system, a sensor-integrating robot controller, and the integration of these into a flexible workpiece-handling system capable of dealing with randomly oriented parts in a unstructured environment.

In response to the call for proposals in ESPRIT II, 644 proposals were received. This program will continue to emphasize precompetitive collaborative research and development. However, more emphasis will be placed on the industrial nature of the program. The aim of the program is to:

- Provide a sustainable European capability in advanced components, especially application specific integrated circuits (ASICS)
- Provide the technologies needed for the next generation of information processing systems
- Enhance the capability of European industry to integrate information technology into complete application systems in a broad range of different environments.

The main areas of concentration for ESPRIT II are summarized in the paragraphs following.

Microelectronics

Many users need to have access to the technological capability to design, produce, and test integrated circuits meeting their particular requirements. These are called "application specific integrated circuits" (ASICS). This is the fastest growing sector of the integrated circuits markets, with a forecast compound annual growth rate of 20 percent.

ASICS accounted for about 20 percent of the total IC consumption in Europe in 1987. This proportion is expected to reach 30 percent by 1992. ASICS are of strategic importance for Europe because they represent a direct input to a wide range of manufactured products.

The European market is estimated to reach 2.5 billion ECU (about $2.9 billion) by the end of 1993, divided as follows:

- 26 percent telecommunications
- 19 percent computers
- 23 percent other industrial applications
- 18 percent direct consumer products
- 14 percent miscellaneous

With the large European ASICS market, the need for supplier-user communication should put European manufacturers in a strong position in the European market. The main aim of the microelectronics sector of ESPRIT II is the establishment of a powerful ASICS capability in the community, concentrating on density, speed, and mixed function.

High-density circuits represent the largest sector of the ASICS market. These generally use CMOS technology. The objective of the Integrated Design and Production System (IDPS) is to establish a quick turn-around facility, to offer the production in 1 month, starting from functional specification, of circuits of a complexity of several hundred thousand gates.

Two projects are being launched to draw up a final specification for such a facility. The IC manufacturers involved are SGS-Thomson, Siemens, Plessey, INMOS, Philips, and ES2 (European Silicon Structures). A number of European systems houses will also be associated.

Bipolar circuits traditionally represent an area of strength for the European simiconductor industry. Continued strength in developing high-performance circuits will have an important impact on the implementations of high-speed transmission systems for fiber optics and satellite communications. Other application areas will be digital consumer electronics and fast supercomputers, where high-speed circuits are needed for superfast logic and memories. It is expected that high-speed silicon bipolar circuits will represent about 15 percent of the total European ASICS market.

One project, 2016, pools all the main European manufacturers in this field (Siemens, Plessey, SGS-Thomson, Philips, and Telefunken) in a joint effort to bring about the technology and design capobilities to enable the competitive production in Europe of high-performance devices operating at frequencies as high as 1 GHz (at VLSI) and 20 GHz (at small-scale integration).

Nonvolatile memories are memory circuits which retain their information when the power is switched off. They are used in computers and other applications such as:

- Plug-in elements for electronic navigation systems to store coastal charts
- Systems such as car engine control units, where the parameters regulating the performance of the engine are stored in the memory and continuously updated with changing conditions (such systems can also supply useful diagnostic information)
- Systems which are progressively being introduced in other sectors such as those for intelligent credit and cash cards, health records, and personalizing transmission equipments.

BICMOS consists of the integration on the same chip, of two different semiconductor technologies: fast bipolar devices and complex CMOS devices. BICMOS is becoming the technology of choice for such products as static RAMS, mixed analog/digital circuits, and gate arrays. It is also being considered for high-performance microprocessors and dynamic RAMS. A big advantage of BICMOS is its greater flexibility and higher level of integration, which optimizes performance and reduces the interfaces needed. This makes the technology particularly valuable in consumer electronics, such as TV's and VCR's, for signal and data processing, and in telecommunications.

In this area, project 2268 (SGS-Thomson, Telefunken, and Plessey) is primarily oriented toward the telecommunications market. Project 2430 (Philips and Siemens) builds on the results of a successful ESPRIT I project and is more oriented toward consumer applications.

In addition to the activity in microelectronics, two main projects have been launched in the peripherals sector. Project 2013 will aim at the development of the technologies for optical rewritable mass memories for computers, and project 2283 has as its objective an A4 format full-color liquid crystal flat panel display for TV and office systems.

Information Processing Systems

In ESPRIT II, emphasis is on the development of more complex IT systems. This will include integration of industrial research and development in software, knowledge engineering, advanced computer architecture, speech, and vision.

Many of the projects will have an important impact on the use of advanced technology by European industry over the next 5 years. The impressive results from ESPRIT I on the development of high-performance/low-cost parallel architecture computers, such as the Supernode machine, will be significantly enhanced by these projects.

The next generation of hardware will provide upwards compatible systems while using most up-to-date technology. The required software will be provided, including operating systems (POSIX conforming), programing environments (PCTE-based), and a range of high-level languages. In the area of declarative systems, two major projects are being launched, EDS (Project 2026) and TROPICS (project 2427), which bring together the main European computer supply companies. These projects will ensure a level of compatibility between systems marketed by these companies which will enable them together to tackle effectively the markets for large database applications, logic systems, and functional systems.

A further project in the advanced computer area, GENESIS (2447), aims to produce the first truly European supercomputer. To date, national programs in Europe have launched supercomputer activities, but the broader European dimension will address a market currently quite specialized but expected to grow rapidly, with the emergence of high-performance machines for computer aided design and for a range of science and engineering applications. This ESPRIT project brings together the two main groups working on the design of supercomputers in Europe, and will enable the expertise developed in highly parallel MIMD architectures and the more traditional SIMD architectures to be shared, providing the required high-performance levels with state-of-the-art technology.

The theme of advancing the rate of industrial maturity of advanced technologies is also evident in the projects launched in the area of knowledge engineering. Priority has been given to projects which enhance the range of applicability of knowledge-based systems and projects which use knowledge-based components to enhance existing industrial systems such as large database management systems and process control systems. Many of these existing systems represent a substantial investment by the user organization, and the use of KBS techniques provides a useful mechanism to enhance the capabilities of the system from a functional viewpoint and the provision of a more user-friendly system interface.

The state of speech processing technology has changed significantly over the past 12-18 months, and the time has arrived for industrial deployment of speech systems. Three major projects are being launched in the speech processing area – SUNDIAL (2218), POLYGLOT (2104) and SUNSTAR (2094). These projects cover the full range of speech processing. They range from the development of systems for telephone access to public information systems through to speech workstations capable of full text-to-speech output and continuous speech recognition. These three projects will be complemented by work on speech systems for noisy environments such as in automobiles.

System design proposals have been targeted at consolidating the progress made in software engineering, and beginning the development of the necessary technology for the support of full systems development and maintenance. The importance of this technology comes from the need for cost-effective development and maintenance and to ensure reliability. Projects are being launched to provide a more rigorous approach to the understanding of user requirements, a faster industrial take-up of formal design methods, and the use of knowledge engineering techniques in the domains of system development and maintenance. Project SCOPE (2151) was launched for software certification. This is a critical area which is likely to have a substantial impact on software development methods and software system quality procedures throughout the Community, and which should eventually lead to a Europewide procedure for software certification, so that users of a software product can be confident that it performs according to its specification.

Integrated Information Systems

The purpose of this portion of ESPRIT II is to make Europe a world leader in the 1990's in integrated systems for offices, banks, hospitals, laboratories, homes, and the other environments.

In the business environment an important technological change is taking place from stand-alone limited-applications computer systems to fully integrated, networked information systems. These systems allow the sharing of information and the sending of messages and files between systems.

The IT Application Support System projects will carry out research and develop the technology from which such integrated systems are built. This includes the workstations which are needed in the business, office, and technical environments. In the business and office environment a workstation will be developed based on emerging microprocessor technology, to integrate the latest in facsimile, telephone, open networking, handwriting, image and voice processing, and document handling. Technical workstations for engineers and scientists will be developed with innovative design, incorporating the latest research in image processing, operating systems, development environments, and data handling.

Several projects cover the needs for intelligent areas within buildings, sites, and cities. Based on international networking standards the local area networks and metropolitan area networks will provide wideband communication, at very high speed, over the latest fiber optic networks. Security issues in this environment will be addressed.

The visual display unit (VDU) is likely to remain for some time the main method of communication from computer systems to their users. Therefore, emphasis in ESPRIT II has been put on projects in image technology. Very high-resolution color graphics VDU's and terminals will be developed based on research in human factors – the interaction between computers and their users. These will be integrated into systems to provide large remotely updatable interactive screens for advertising and news. Other technology will be explored to allow the photographing, storing, and processing of very high-quality images. One application is based on moving images recorded outdoors by a camera linked over the telephone system to a color publishing system elsewhere. Another project explores the photography, storage, and retrieval of art images for museums in Italy, France, the UK, and Germany.

The Integrated Information Systems area will develop the appropriate architecture, tools, and application software to link together the underlying technologies discussed above. A major project will develop an object-oriented approach to application software design and development, adapted to several environments, such as municipal administrations, company financial management, project planning, and hospital work management. The PODA Project (2374) will apply the office document architecture standard developed under ESPRIT I to multimedia document handling in networked multivendor systems.

In addition to such applications as on-line banking, shopping, medical monitoring, education, and access to news and information data bases, home systems will be used to monitor and control energy use, appliances, and security. The Home Systems Project (2431) will provide standards and solutions for the home.

Further projects address specific application areas. The Bank 92 Project (2476), will provide the computing solutions and standards which financial institution will need in the unified financial services market after 1992. Another, IACIS (2512), will support intelligent areas in large information-based organizations. This will be used to link several Mediterranean port authorities in Italy, Spain, and Portugal with the Atlantic port of Le Havre, in France. It could also be used for events like the Olympic Games. The ELO Project (2382) will develop software and systems to meet the productivity requirements of modern offices including tools, communications, applications, and computer-based learning.

Computer Integrated Manufacturing (CIM)

CIM is a potentially large market area for IT not yet dominated by overseas suppliers. CIM represents a challenging and complex test bed for IT in that systems must operate in real time, cope with hostile environments, and operate for long periods with minimal manning.

Activities include advance design and modeling techniques, unified strategies and implementations of both logistical and physical control of manufacturing processes, robotics, and other shop floor systems, and the communications systems for the shop floor and process plant environments. Key targets such as flexible automatic assembly and the high throughput, fail-safe operation of modern process plants will provide test beds for these activities.

The tendency for new projects to cluster around successful ESPRIT I projects is encouraging and is an early indication that vertical mass is building up.

The CNMA Project (2617), with its parallel action on test tool development (2292), will allow communication vendors to move into a leading position in factory and plant communications, as well as fueling the provision of future conformance testing services in Europe.

Project 2277, led by the German systems house Actis, offers a promising approach to the problem of direct factory-to-factory communication in multisupplier operations.

The area of product design and analysis has evolved rapidly in recent years as minicomputers have become viable possibilities for CAD workstations. Project 2590, led by MATRA, is an initiative to strengthen the European position in the CAD/CAE field in product and production modeling. The partners involved represent the strongest European CAD-vendor team. They will develop a new generation of CAD systems to allow the integration of modeling functions which are at present separate and sequential. Thus the current overheads for manufacturers which include high costs, long lead-times, and complex organization structures can be reduced.

This is a project which could build market share where there is now a gap and bring direct benefits to users.

A parallel project in the same area (2165), led by Krupp Atlas Datensysteme, brings together an impressive team which will apply the results of the ASP group from the German and Norwegian national programs.

Mobile robots and process industry topics are among the new items in the work program. Mobile robots have many potential applications including forestry, agriculture, mineral extraction, plant maintenance, space operations and defense. For manufacturing, availability of mobile robots would lead to new concepts in factory layout and the ability to solve the problems of maneuvering in unstructured environments.

Project 2483 covers this area. The team will develop an advanced perception and navigation system for mobile robots, applied first to the forestry domain. The Finnish partners will develop the prototype with community companies targeting the component market for this and other types of mobile robot.

Robots and other types of material transport systems are already well developed. As methods and tools for integration improve, the demand for flexibility is becoming stronger. Hence, there is an increasing move toward greater sophistication in shop floor devices, and the emergence of new types of device. This provides many opportunities for Community vendors.

The automated crane is an alternative to the automated guidance vehicle as a form of transport on the shop floor. The topic is addressed by project 2280, led by AEG. The approach could open a large new market in manufacturing, construction, shipbuilding, and haulage environments.

In the process industry, ESPRIT Project 2671 attacks a similar problem by using knowledge-based systems to gather sensor information. ICI, one of the main users in the process industry, is involved, thus assuring that knowledge of the process will be provided for the prototype. The IT market in process control is largely dominated by foreign competitors. This proposal is a first step toward opening the market for European vendors.

Basic Research Actions

In most countries funding is concentrated on projects deemed to have commercial viability. Basic research groups are traditionally low on funding. Many researchers leave school without doing advanced degree work.

The new ESPRIT II initiative is concentrating on selected areas. Collaboration is considered fundamental and will include cross-fertilization in precompetitive research.

The program will provide a reservoir for industrial research to build upon. The knowledge gained from basic research must be continuously replaced. The objective of the program is to provide collaboration and ensure increased involvement of researchers.

Areas selected are based on the following criteria:

- The likelihood of advances being made
- The work is clearly upstream or precompetitive
- Value will be added through European collaboration.

Following the first call for proposals in 1987, 300 proposals were received, requesting funds far beyond those available. Sixty-two proposals were chosen at a funding of 59 million ECU ($109 million). They will involve 285 participating organizations.

The areas being covered include microelectronics, computer science, artificial intelligence, and cognitive science.

Comments

ESPRIT, the largest research and development program sponsored by the European Community, has achieved a reasonable degree of success in its first 5 years. ESPRIT II which follows immediately, will place more emphasis on the development aspect in order to help the industry get products for the market in the 1990's. The funding for ESPRIT II is 3.2 billion ECU for the 5 years, a little more than double that for ESPRIT I. The program is likely to achieve significant results.

11/18/88

* Inter-European Defense Industry Cooperation

35190104 Paris L'USINE NOUVELLE in French
15 Dec 88 pp 18-20

[Article by Jean-Pierre Jolivet and Jean-Pierre Casamayou; first paragraph is L'USINE NOUVELLE introduction]

[Text] New cooperation projects, offers of cross holdings, and company mergers: European arms industrialists are starting their big maneuvers. But the changes promise to be complex, with some French being outstripped by their more enterprising neighbors.

The Europe of armaments is in a turmoil and discovering new rules of the game: the GEC [expansion unknown] would acquire 50 percent of Siemens' military activities as part of its joint bid with the West German firm to take over Plessey; Thomson-CSF is negotiating with British Aerospace to establish a large pan-European defense pole; Edzard Reuter, chairman of the Daimler Benz management board, is proposing to that same British Aerospace that there be an exchange of holdings between the two firms; Jean-Luc Lagardere, managing director of MATRA [Mechanics, Aviation, and Traction Company], is preparing to raise 2 billion francs in the financial markets and wants to strengthen ties with his firm's stockholders, the GEC and Daimler Benz; and Henri Martre, boss of Aerospatiale [National Industrial Aerospace Company], is urging a merger between his company's helicopter division and that of the MBB [Messerschmitt-Boelkow-Blohm].

For the Europeans, the hour for new strategies has arrived. Traditional forms of cooperation are giving way to closer alliances accompanied by stock acquisitions. Of course, everything will not be done in a day. But the mechanism has just engaged. "It is a step toward the emergence of a small number of large European groups which alone will be capable of surmounting national market barriers and rivaling the American giants," say observers of the sector. We have already seen this in the glass and steel industries. The process is underway in telecommunications. And the European arms industry is not going to escape the same process.

Does this reflect the will of the industrialists? Not always. Is it because of incentives by the states? Most certainly. But developments in the world arms market are the chief force behind these new alliances. The industry has been in crisis for the past 4 years. The big contracts in the Middle East have practically disappeared because the states in that region are overequipped and because of the collapse in oil prices. Benefiting from a weak dollar and better political positions, the Americans are returning in force. Also to be contended with are newcomers such as the Brazilians, Argentines, and Israelis, whose successes are becoming increasingly frequent. Result: the European defense industry has idle capacity. For example, French firms in the professional electronics industry, two-thirds of whose turnover comes from defense contracts, are depleting their order books at a faster rate than they are bringing in new contracts. In 1 year, their book dropped from 78.5 billion francs (1986) to 75.4 billion francs. Disturbing.

Thomson, which owes 62 percent of its military activities to exports, is preparing for a drop of from 20 to 25 percent in its turnover by around 1990 or 1991. Dramatic. The worries are the same in the case of the British helicopter manufacturer Westland and the FRG's combat tank manufacturer Krauss Maffei. All those difficulties are inducing European industrialists to find new markets to take up the slack. In this case, that means Europe, since they are unable to penetrate the U.S. market.

The trouble is that a real European market does not exist. The large number of companies and the desire by the states to support their own industrialists keep the market split. In such a context, it is difficult to rely on the effect of mass production to finance research and development programs, the cost of which is skyrocketing. All the more since financial support from the state is no longer what it used to be. In the sphere of defense electronics, where investments are particularly burdensome, 43 percent of R&D expenditures are currently paid by the French state—compared to 55 percent 15 years ago. Defense budgets, like those of the firms, have reached the threshold of the tolerable.

New Weapon Programs

Weapon system	Participants	Anticipated development cost Cost (billions of francs)
Third generation AC3G antitank missile	France (Aerospatiale) Great Britain (British Aerospace) FRG (MBB)	9
SAAM and SAMP antiaircraft missile	France (Aerospatiale, Thomson) Italy (Selenia)	10-15
ASRAAM air-to-air missile	Great Britain (General Dynamics) FRG (Bodensee Works)	n.a.
Helios reconnaissance satellite	France (Aerospatiale, MATRA) Italy (Aeritalia, Selenia) Spain (CASA, INISEL)	7.5
PAH-HAC combat helicopter	France (Aerospatiale) FRG (MBB)	12

New Weapon Programs

Weapon system	Participants	Anticipated development cost Cost (billions of francs)
Third generation AC3G	France (Aerospatiale)	9
NH-90 tactical transport helicopter	France (Aerospatiale) FRG (MBB) Italy (Agusta) Holland (Fokker)	10
EH-101 tactical transport helicopter	Great Britain (Westland) Italy (Agusta)	12
EFA (European) Fighter Aircraft)	Great Britain (British Aerospace) FRG (MBB) Italy (Aeritalia) Spain (CASA)	70

So far, European indusrialists have managed to surmount those problems thanks to an active cooperation policy in connection with major programs carried out by economic interest groups [GIE's]. From Sepecat [European Company for Production of the ECAT Aircraft] (manufacturer of the Jaguar) to Eurocopter (responsible for the PAH/HAC antitank helicopter), there is no lack of examples. But they are limited to cooperation on specific projects because of the sometimes contradictory requirements of the various armed forces. Less than 15 percent of the equipment used in the French Armed Forces was designed jointly with a partner.

"I wonder if that type of cooperation has not now reached its limit," says Henri Conze, official representative of the minister of defense. Sluggish structures, difficulties in coordination, the booby traps of national regulations, dilution of responsibility, and the additional cost of joint development are a handicap. All the more since the GIE's—which are often marriages of convenience imposed by governments—in no way prevent the participating industrialists from developing competing equipment on their own. An example is the MBB's development of the BO-108 helicopter as a rival to the Ecureuil of its partner, Aerospatiale. "Moreover, those cooperation projects have not so far promoted a European redeployment of firms, as has been the case in the civilian sector," says Henri Conze.

Hence the necessity and need to go further and find other forms of cooperation and alliance. That is what is happening in the case of the various proposals for merged activities and cross holdings that are being announced these days. "Acquiring a stockholding interest makes it possible to rationalize not only research but also industrial plant and investments, since those matters are handled by the boards of directors," says one official at MATRA. It is time for the arms industry to become an industry like any other.

While France is making its first faltering attempts at that kind of thinking, the British and West Germans are a length ahead. In both cases, the pattern has been the same: privatization, concentration, then, in the third phase, redistribution. Redistribution within national groups or across frontiers, as witness the process underway between Siemens, the GEC, and Plessey.

In Great Britain, Margaret Thatcher has reshaped the arms industry by abandoning unprofitable industrial sectors or reducing their size. Naval shipyards and land weapons are examples. Once the arsenals of the Royal Ordnance Factories had been privatized, they were resold to Vickers and British Aerospace. The latter, willingly or not, bought Rover even though its only interest was in Land Rover military vehicles. Now it is the turn of Northern Ireland's aircraft manufacturer Shorts to be sold at auction. Among the potential buyers is the GEC, the electronics firm which, after swallowing up Marconi, is launching a bid to take over Plessey. Fortified by its recent successes with exports and supported basically by its government authorities, the British defense industry is therefore resuming the offensive.

On this side of the North Sea, it is the West German industrialists who have taken matters in hand—with, it is true, the advantage of having an arms industry which is growing and which, in general, is buried within diversified groups. For example, Edzard Reuter, the managing director of Daimler Benz, has succeeded in gradually rebuilding a combine of the type that existed in the Third Reich. Mercedes automobiles, AEG [expansion unknown] electronics, MTU [Engine and Turbine Union] engines, and Dornier and MBB aircraft and weapons make up a group with 280 billion francs and 380,000 employees. Now that he has grabbed up everything in his own country, this new strong man of West German industry is proposing alliances and cross holdings to the Europeans.

Attitudes in France are more varied. They range from fierce nationalism in the Dassault style to pan-Europeanism of the Aerospatiale type. "Sixty percent of our business is done in cooperation and through consortiums," says Henri Martre, Aerospatiale's managing director. "That proportion will soon rise to 85 percent. For us, strengthening our European alliances is fundamental." His attitude is reinforced by that of the government, which is pushing in that direction despite a vision of the "Europe of defense" that is more political than industrial.

For France, it is a serious time. Now surrounded by builders of the EFA (the European Fighter Aircraft, which is the Rafale's rival), our industry has the look of a besieged fortress. Despite the moves toward reciprocal arms purchases, French industrialists are feeling more and more isolated. "I even have the feeling that the European spirit has receded," says Henri Martre. The same thinking exists at Thomson, where it is said that every door closes as soon as the French offer to cooperate on the EFA. Hence the urgent need for a strategy for reinforcement and for breaking through the encirclement.

Aerospatiale's managing director goes on to say: "We have begun to respond to those movements by combining our avionics activities with Thomson's with a view to a merger." A similar attitude exists in the field of radars, where Jean-Pierre Chevenement has forced Thomson and the ESD [Serge Dassault Electronics] to merge.

Thus strengthened, it is clear that French industrialists will be in a better position to negotiate the acquisition of stockholding interests or to unite with foreign partners. And while the northern countries are making difficulties, southern countries such as Spain and Italy are ready to open up—as is shown by the antiaircraft defense program with Italy's Selenia or the Helios military satellite project. On the industrial level, the move is toward the setting up of supranational holding companies (with equal shares held by the countries involved) that control specialized firms.

This new European industrial landscape will be brought forth in pain. In France, the arms industry suffers the same handicaps as civilian industry: chronic undercapitalization and a lack of interest on the part of the banks, whereas the Dresden Bank and the German Bank are fully behind the MBB and Daimler Benz. Added to that are the complexity and diversity of regulations (for example, they prohibit the GIAT [Industrial Group for Land Weapons] from acquiring an interest in Krauss Maffei). And what can one say about the game of musical chairs involving cabinet-appointed company chairmen? The Gallic game of "combat of the chiefs" forces bosses like Alain Gomez or Henri Martre to spend their energies protecting their jobs while their competitors go all over the world winning markets and forming alliances.

Another obstacle to those alliances is the attitude of the military. Their contradictory requirements prevent the development of common equipment. Furthermore, they have little passion for European industrial policy. The West German Army preferred the U.S. Apache helicopter over the French-German PAH/HAC, and the West German Navy has chosen Lockheed's Orion even while the MBB and Dornier are participating in the building of Dassault's Atlantic. As for the French Navy Air Force, it is bestowing its favors on the F-18 to the detriment of the naval version of the Rafale. Lastly, nationalism—natural in matters of defense—adds to the difficulties of harmonizing requirements and establishing transnational companies. The recent dismantling of the French-British subsidiary Thomson-Lucas illustrates the difficulties involved in setting up international companies.

But those difficulties are not keeping companies such as the GKN [expansion unknown] and Panhard from contemplating industrial agreements or preventing Thomson from continuing its discussions with British Aerospace. But cooperating in the field of missile homing heads, mortar ammunition, or simulators does not mean merging with the British aircraft manufacturer. People are not yet ready for that. One can imagine the reactions if the government sold its shares of Dassault stock to British Aerospace or the MBB.

Science in Europe

nature

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What science for Europe's 1992?

An acid test of the European Community's intentions in support of science after 1992 is its willingness to respond to an imaginative proposal from radioastronomers.

EVERYBODY in Europe is being conditioned by the European Commission to believe that 1992 will mark the arrival of the authentic common market in which goods and services will be traded freely, in which capital and people will flow with hardly any artificial interference to the places at which they will be most productive and in which prosperity will grow by leaps and bounds. It is a brave prospect, if somewhat tarnished by the knowledge that this is what should have happened more than 30 years ago, when the European Community was first formed, and by the suspicion that member governments will not instantly forget the stratagems they have learned for replacing tariff barriers by less tangible restraints of trade. Meanwhile, very little has been done to pose intelligently, let alone to answer, the question of what 1992 will do for science and technology. Will 1992 come and go without the question being raised?

With a budget exceeding $1,000 million a year, the European Commission (the Community's executive branch) is already a big player in science and technology, but most of its present activities in the field will be inappropriate in the circumstances it hopes to have created by 1992. Most of the Commission's energy and money goes into industrially oriented projects such as ESPRIT, the information technology enterprise, in which grants for research and development are made to consortia of research and development groups, mostly industrial but with some academic participation. The goals of these projects are supposed to fall short of the development of products that can be sold, but success is meant to put their participants within reach of profitable markets. As things are, research and development projects qualify for the Commission's support only if the groups they involve are drawn from more than one member state. The rationale for this requirement is that of assisting technical change in a manner that spreads the benefits through more than one member state. The same condition must be satisfied by those in basic research who seek support from the Commission, which is spending upwards of $150 million a year on projects spanning intra-Community frontiers. This pattern of spending, logical enough in present circumstances, will make no sense if 1992 does indeed accomplish what the Commission hopes.

Reasons

The reasons are straightforward. If 1992 means anything at all, it means that Europe is reconciled to the most efficient division of labour between European manufacturers (of software and hardware alike). Gone will be the time when it could be a legitimate policy objective of either member governments or the commission to ensure that, say, the electronics industry continues to flourish in this country or that. Ideally, this would imply that the Commission should be given powers to ensure that its member governments do not, by subterfuge, use national funds to subsidize the technical development of their own manufacturers. (The use of defence research and development contracts for this purpose is the most serious loophole, which should be closed.)

But, by the same test, the Commission itself should abandon its present pattern of support for industrial consortia spanning Europe's internal frontiers. If the intention is that industrial companies should compete freely with each other, it will make no sense that the Commission should be spending considerable sums of money to help weaker companies compete with the more successful.

That will bring comfort to some member governments, the British for example, which have been sceptical of the Commission's plans even in present circumstances. But none of that implies that the Commission can or should pull out of research support altogether. While 1992 will rob the Commission's programmes of applied research of their justification, the case for supporting basic research will be even stronger than it is now. Then, in heady 1992, the Commission will inevitably be the source of support in the last resort for the infrastructure of European science. Its function then should be to seek out and to support projects promising to add to Europe's strength in basic science which, for one reason or another, are not supported by national governments. With 1992 almost upon us, the Commission should be starting now to work in that direction.

Disappointment

That is why the commission's failure to support European radioastronomers' plans for strengthening their VLBI network are a cruel disappointment (see *Nature* 337, 301; 26 January 1989). By general consent, the project is an excellent way of making progress in an important field of basic science, but one which also has a potentially important industrial spin-off. The need is for a European centre at which signals recorded by several European radiotelescopes being used in concert as an interferometer can be electronically compared. Technically, the task is complicated because the amount of data gathered by each telescope can be huge and because, in Europe, there may be more than half a dozen independent signals to be compared. The spin-off is the opportunity to develop electronic machinery that is more suitable for this and other information-processing tasks than that now available (from the United States) and also cheaper. Yet the Commission has turned down the proposal on the grounds that none of its existing schemes for research support can accommodate the radioastronomers' ambitions. The amount of money required to launch the project would be too large a proportion of the budget of the committee called CODEST, which is the chief source of funds for basic research, while there would also be running costs which the Commission has no means of providing.

That puts the bureaucratic cart before the horse. If the Commission has no present scheme for supporting a project whose virtues are widely acknowledged, and which could play an important part in strengthening both European science and the ideal of European collaboration, there is a simple answer: the Commission should devise one. And it should do that quickly, however much it may fear that the VLBI consortium's plans, which entail the establishment of a permanent institution, will set an awkward precedent. For the truth is that institution-building of that kind is crucial to the kind of function that will fall on the Commission's shoulders after 1992. The sooner the Commission faces up to that prospect, the sooner it will persuade people that 1992 is really on the way. ☐

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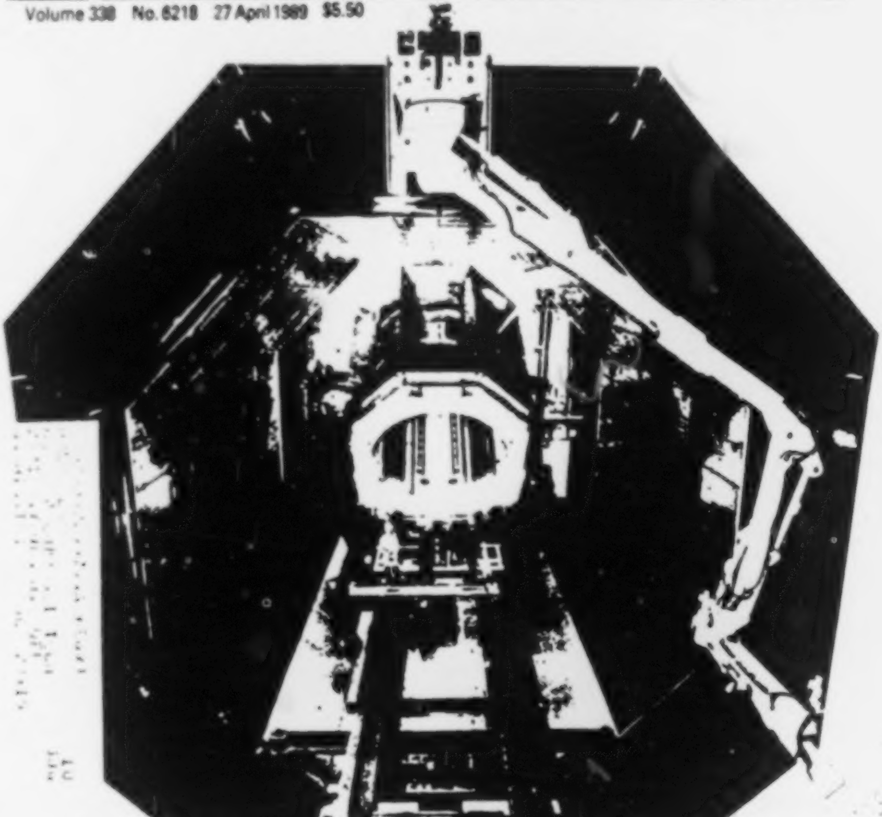


SCIENCE IN EUROPE

Collaboration in a wider Europe

Europe is in a mood to collaborate in research, as in much else, but doubts persist about the proper framework. This survey of science in Europe may resolve some issues.

EVERYBODY agrees that Europe is in transition, but the end-point is undefined. That is the starting point for the survey of science in Europe that occupies the following pages. Several important influences, cultural, economic and political, have conspired to provide an impetus for change that, in the long run, will help determine what the world is like, but the most interesting of them is the growing inclination of those who live in Europe to regard themselves as members of a community whose common interests transcend the chauvinistic differences that have bitterly divided them in the past.

That is why this survey differs markedly from others in this biannual eight-year series. It is not so much a record of achievement and disappointment in research, as of the mechanisms by which Europeans collaborate. And because there is so much going on, this will seem even more neglectful than previous surveys of important institutions contributing to the increasing cohesion of European science. It is hoped that those who are concerned with these institutions will not be too deeply offended.

Many of the institutions that now exist to foster European collaboration have their roots in the period immediately after the Second World War, and in the then common revulsion against the folly that had brought most European states economically to their knees. But there is an important sense in which the lesson also derives from the earlier 1914–18 war. In the settlement of that disaster, states called great powers redrew the map of Europe artificially while demanding that Germany should pay for the cost of the trouble it had caused — in retrospect a device for creating the conditions that made the Third Reich possible. That seemed a bad precedent in 1945. But by then, the great powers of the time had already (at Yalta) redrawn the European map so as to divide East from West. All the more necessary that the other ingredients of the settlement after 1918 should be avoided.

That is why the past 40 years have seen so many attempts in Western Europe to create a framework in which national interests and cultural differences would be subsumed within a common purpose. In rapid succession, there were formed the Western European Union (concerned with mutual defence), the Council of Europe (to foster common social and legal standards) and the succession of economic communities, which were at first concerned with commodities such as iron, steel and nuclear energy, but now, as with the twelve-member EEC, are concerned with the whole of economic activity. (The second half of this survey, beginning on page 726, deals with EEC science and what should be done about it.)

Collaboration is evidently infectious. The dramatic proof of that is Mr Mikhail Gorbachev's recent talk of the "common European home". Gorbachev, who is not naive, no doubt has many objectives. But suddenly, it seems, everyone wishes to collaborate. Poland, Hungary and Yugoslavia are talking of full membership of the Council of Europe, its Convention on Human Rights apparently not an obstacle. Turkey has applied for membership of the EEC, Austria is wondering whether to do so, while the Scandinavian countries and Switzerland may yet have a close relationship with the EEC.

Where will it end? And will the outcome revitalize European science? The continent (including its offshore islands) has never been full of optimists, which is why there is also now as great a need of realism. It is easier to decree collaboration than to ensure that it succeeds, especially in the practice of scholarship and research — and when the decrees are made by politicians. Here are some challenges and rules for optimists:

■ **Higher education.** In the 1860s, the great Ernst Mach left Vienna to teach at Prague, which is not very far away, but that would not now seem a natural move. Europe now has too many separate university systems. Even within the EEC, too many universities are too tightly in the pockets of their governments, national or even regional, yet there are no plans for integrating them. So how, and when, to make progress towards a wider framework?

■ **Basic research.** There are two frameworks of collaboration — within the EEC, and more extensive (typified by CERN and the European Science Foundation). Within the EEC, the European Commission should in future play a stronger part in supporting basic research (see page 734), but that may be detrimental to wider collaboration. How are those desirable goals to be balanced?

■ **Applied research.** The EEC centrally supports research intended to put its industry in better shape, but there are contradictions, not least that with the principle that successful industrial companies stand on their own feet, paying for their own research and development. EEC practice is also a potential impediment to wider economic collaboration. How will those issues be resolved?

In all this, there is a crucial issue too often overlooked — the danger that European collaboration in some defined framework will be exclusive of the world outside. The danger that the EEC will emerge from the upheaval planned for 1992 as a high-tariff chauvinistic group of self-satisfied states is the most immediate. Those who would suffer most would be those stranded within the tariff barriers, but Europe's relationship with the outside world would also be seriously damaged. That is why the EEC's goal of a single market, promised for 1992, is not in itself sufficient. It also matters crucially whether it is an outgoing grouping. □

SCIENCE IN EUROPE

EUROPEAN SPACE AGENCY

Once-lame duck now exudes self-confidence

Paris

THE European Space Agency (ESA) is "the best example of what European collaboration can achieve", says its director-general, Reimar Lüst. "We are not only involved with basic science and new technology, but are faced with heavy competition, unlike the European fundamental research facilities, which have life easy."

Yet, with only one-tenth of the budget available to the US National Aeronautics and Space Administration (NASA), ESA has become a force to be reckoned with.

The collaboration began in the early 1960s, under the impetus of European scientists, as the European Space Research Organisation (ESRO) and the European Launcher Development Organisation (ELDO). ESRO was highly successful, developing a series of scientific satellites launched by NASA, and establishing specialized space-science centres in the Netherlands, Italy and West Germany. But ELDO was a damp squib and failed to produce a viable launcher.

ESRO and ELDO metamorphosed into ESA in 1975 with the signing of a convention by 11 European countries: Belgium, Denmark, West Germany, France, Ireland, Italy, the Netherlands, Spain, Sweden, Switzerland and the United Kingdom. Austria and Norway joined last year, when Finland became an associate member.

ESA has taken European space capability out of a purely scientific domain, dependent on US launchers, into telecommunications, Earth observation and meteorology. A major step was the establishment, in 1980, of Arianespace, a commercial joint-stock company (59 per cent owned by France) responsible for the exploitation of ESA's successive generations of Ariane rockets. With a record of only four failures out of 30 launches, Arianespace now has 50 per cent of the world commercial launch market.

Once the heart of European collaboration in space, basic science now represents only 12.4 per cent of ESA's total 1,573 million ECU budget. But the science programme, like the general budget, is mandatory. All member states have to contribute in proportion to their gross national product. Consequently, unanimity is required whenever policy or budget decisions are put to the vote at ministerial-level meetings. Last year, Britain found itself isolated when it initially refused to agree a 5 per cent annual increase in the science programme budget, holding up scheduling and potentially threatening some projects.

The science programme is constructed around a long-term plan, put together by the science programme committee and covering the next 15 to 20 years. The current programme, called Horizon 2000, was jubilantly approved at the 1985 ESA council meeting at ministerial level, in Rome. It comprises four 'cornerstone' projects in solar terrestrial physics, a comet nucleus sample return mission, an X-ray multi-mirror mission and a submillimetre astronomy project.

For Lüst, the science projects often help the push towards new technology — as was the case with the optics of the Hipparcos astronomy sattelite, one of four 'medium-sized' missions planned under Horizon 2000. (Hipparcos is due to be launched in a few weeks.) Two others, Ulysses and the Space Telescope, are joint ventures with NASA, and have had to stay on ice for almost three years since the suspension of shuttle launches in 1986. Future ESA missions will be launched by its own Ariane rockets.

ESA's satellite-view of Europe. Europe could comfortably double spending on space, says ESA's director-general.

The applications programmes are where national passions, purses and fantasies find direct expression. Participation is optional, but ESA ensures that backing nations receive industrial contracts in proportion to their investment.

Telecommunications satellites have been supported by all member states and, with Earth observation and microgravity projects, have stimulated the European Commission to become involved to work out norms, organize networks of users and to improve what it considers to be an inadequate infrastructure.

But ESA's most controversial and expensive move, where tangible returns are less certain, came in November 1987 when a majority of member states backed a programme for manned space missions. Together, ESA's contribution of an attached laboratory to the NASA Freedom space station, a free-flying laboratory and a polar platform, now account for almost 40 per cent (609 million ECU) of its total budget, while the French-conceived Hermes space plane and the Ariane 5 rocket needed to launch it swallow a further 10 per cent (153 million ECU). Britain has opted out of these projects, so British companies will benefit hardly at all from the contracts.

Lüst applauds the decision to enter the manned space arena. "The trend will move towards robotics, but this will take 20–30 years. Meanwhile, there is still a need for people." He argues that the Hubble Space Telescope, due to be launched at the end of the year, has been designed to last for ten years. But if it needs repair during that time, "it may be more expensive to recover than to repair it in orbit."

To Lüst, there is no doubt about the value of ESA for European science and industry. "The system really works. On satellite projects, probably two dozen truly European teams work together. Europe needs a drive on high technology and ESA provides an excellent vehicle for this." He is proud that ESA scientists and engineers are already exploring new frontiers such as robotics, synthetic radar and laser applications for optical communication between satellites.

"We also need more civil and less military research", says Lüst. Since 1980, the ESA convention has declared the purpose of its activities as exclusively peaceful, a constraint that has strung out negotiations with NASA over the Freedom space station. He also feels that space science is good value for money. "Europe's gross national product is about three-quarters of that of the United States, yet we spend only one-eighth per capita of what the United States spends on civil research. Only 0.05 per cent goes on space technology. Even if the figure doubled it would still be all right."

But last year, ESA found its member states less united and resolute than in 1985 and is due for a new round of debate when it seeks backing for the Data Relay Satellite, which, according to Lüst, is an essential element of the Columbus package.

Meanwhile, Columbus is not yet out of the woods. President Bush has still to persuade Congress to go ahead with Freedom. But, says, Lust, if the United States reneges, ESA will continue alone, although it may be more reluctant to cooperate with NASA in the future.

Peter Coles

EUROPEAN SOUTHERN OBSERVATORY

Southern sky surveyed

Garching, near Munich

Created out of the ruins of European astronomy after the Second World War with the help of the Ford Foundation, the European Southern Observatory (ESO) has become one of the most successful undertakings in European science. After years of solid contributions to optical astronomy, ESO now stands poised to seize the initiative internationally with its planned Very Large Telescope (VLT).

Following the model of the European nuclear research centre CERN, ESO goes beyond the financial abilities of individual member states to build powerful instrumentation in its field. Since the creation of ESO in 1962, its main tasks have been to build telescopes for scanning the Southern Hemisphere and to develop new instrumentation for optical astronomy.

Among telescope designers, ESO is now known as the pioneer of what are called active optics, embodied in its New Technology Telescope (NTT), which began a series of trial observations on a mountaintop in Chile in March. Active optics are the computer engineers' alternative to the cumbersome slabs of glass from which telescope mirrors have traditionally been made. Many hold that the diameter of conventional glass mirrors has now reached its technical limit, and that active optics are the only way forward.

The idea is that a microcomputer controls transducers which in turn control the precise figure of a thin glass mirror, distorted though that may be by gravity and other influences. The aim is superior resolution, but also telescopes that are more manageable and less costly. Active optics will play a pivotal role in the VLT, which is actually a set of four 8-m mirrors yielding the equivalent of a single 16-m dish. The telescope will be the largest in the world when it is completed in 1998.

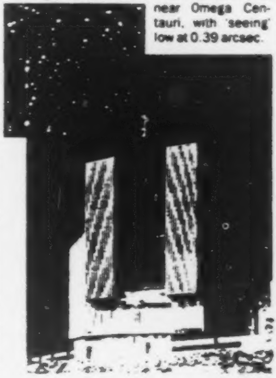
The five original member states — Sweden, West Germany, Belgium, the Netherlands and France — were joined by Denmark in 1967 and Italy and Switzerland in 1982. Austria is now making a strong bid for membership. But despite an early interest, Britain has stayed out of ESO, concentrating at first on collaborations at observatories in South Africa and Australia and, more recently, on telescopes of which it is the chief owner in the Canary Islands and Hawaii.

ESO has its European headquarters in a smart modern building in the Bavarian flatlands at Garching, near the Max Planck Institute (MPI) for Physics and Astrophysics, the MPI for Plasma Physics and the campus of the Technical University of Munich. It operates or shares the 15 telescopes (counting the NTT) at La Silla in northern Chile, 600 km north of Santiago. The staff of 280 is divided between Garching and La Silla, where most of the technical staff is Chilean. In Garching, there are about 50 astronomers (10 permanent) and 80 other staff members. The remote site at La Silla — Spanish for "the saddle" — in the Atacama Desert is "one of the most unpolluted sites on Earth in every sense", says Richard West, an ESO astronomer. The first telescope went into operation in 1968.

The organization of ESO is virtually identical to that of CERN (see page 722). An administrative council meets twice a year to decide budget and policy issues. A director-general (now Harry van der Laan of the Netherlands) is responsible for day-to-day operations. The scale is the most important difference: ESO is about ten times smaller than CERN. The annual budget of about DM50 million (it will rise to DM100 million in the 1990s because of the VLT) is shared by member states, with the larger states paying more.

ESO has generated excitement among European and outside astronomers with its ambitious plans for the VLT. Expatriate Europeans such as Jacques Beckers of the Netherlands, recently of the US National Optical Astronomy Observatory, have been lured back from the United States to work on the VLT, whose construction was approved unanimously by ESO member states in 1987. The VLT construction budget is DM382.2 million.

VLT is the logical offspring of NTT. The active optics of NTT are expected to allow the 3.58-m telescope a threefold improvement in resolution over that of previous instruments. Active optics will be a necessity for the VLT, whose 8-m mirrors would collapse under their own weight if ground at conventional thickness. ESO researchers expect to choose a site in Chile for the VLT by 1990. The first telescope may be working as early as 1995.



The New Technology Telescope and results of 'first light' on 23 March. Inset shows an area near Omega Centauri, with 'seeing' low at 0.39 arcsec.

One of ESO's obvious difficulties is its popularity. As at other well-equipped observatories, only about a half of the 700–750 applications for observing time can be granted each year, and many successful applicants receive less time than they ask for. A committee made up of astronomers from each member state rates the proposals numerically, but the director-general has the final say. Van der Laan's task is "tricky and difficult", says West, especially because not all heavenly objects can be observed all the time.

Although ESO is a European organization, astronomers from member states enjoy no advantage in the refereeing process. Chilean, US and British groups have all been granted time in recent years. West says that the competition for time has raised the quality of European proposals — and, in the end, Europeans do receive most of the observing time.

What advantages accrue to ESO's member states? The most obvious is the organization's reason for existence — that astronomers have access to telescopes of a quality that national organizations would be unable or unwilling to finance. There are other tangible benefits, not least access to technical knowhow. Thus ESO was early in the field with the use of image-processing systems for extracting information from images of the heavens. Astronomers who used to travel to Garching to use its image-processing systems have often been able to find the funds with which to build their own, but ESO continues to provide software support to member states and others free of charge.

Italy and Denmark have decided to build versions of ESO instruments for their national astronomy programmes. Indeed, Italy joined ESO in part to gain the technology to build its own 4-m telescope. The project has a name — Galileo — but not yet a site.

ESO's small staff of professional astronomers, deliberately kept small, is regarded as a collective benefit. To keep ideas flowing in, there are only a few permanent positions. In striking a balance between a self-standing research organization and a service organization for its members, ESO (prodded by its council) has leant in the second direction.

ESO wins praise from astronomers not only for providing a unique opportunity for them to observe the southern sky. La Silla and Garching are also well known as meeting places where collaborations are incubated. VLT may be such a powerful magnet for observers everywhere in Europe that its influence could extend far beyond mere time-sharing. After all, as Beckers says, VLT "is where [optical] astronomy is going."

Steven Dickman

RADIOASTRONOMY

Fight for tape recorders

Dwingeloo (Netherlands)

IMPROBABLY hidden in the pine-woods south of this hamlet near Groeningen is a radiotelescope and a smattering of low-built offices. The site is that of a European collaboration of radioastronomers who may yet be able to build a gigantic tape-recorder allowing a score of observatories elsewhere in Europe to pool their signals in the astronomers' common cause of seeing further. But the cause has been cruelly frustrated.

Dwingeloo is also the headquarters of the European Consortium for VLBI (for Very-Long-Baseline Interferometry). The technique of correlating accurately timed signals from several radiotelescopes, all pointing in the same direction, makes the accuracy of the position of a simultaneously observed radio source greater than the sum (in any sense) of the accuracy of the separate observations. The headquarters of the Netherlands Foundation for Radio Astronomy (NFRA) is also sited at Dwingeloo.

The European Consortium is, just now, at its wits' end because of uncertainty over its plans for the future. Last year, it applied to the Stimulation programme of the EEC for funds to finance its technical development. But the EEC Commission said "No".

In reality, the VLBI Consortium is a club. The founder members are the observatories at Bologna, Effelsburg (near Bonn), Dwingeloo, Jodrell Bank and Onsala (Sweden), and associate members include the Paris Observatory (Meudon) and institutes in Moscow and Poland. The six regular collaborators have committed between a quarter and a third of their observing time to VLBI. Projects are put forward by astronomers individually, and assessed by a programme committee. Richard Schilizzi, project manager for NFRA at Dwingeloo, says that the consortium is two to three times oversubscribed on a 24 hours a day basis. Moreover, the network is growing rapidly.

Like all VLBI collaborations, the club's collective ambition is so to improve on the accuracy with which measurements of the position of distant radio sources are made that the large-scale yardstick of the structure of the Universe will be better known, nearby galactic and even stellar phenomena will be better understood and the year-by-year movement of the Earth's tectonic plates will be more accurately measured.

The European Consortium is anxious not to be left behind by its competitors, the chief of which is that in the United States. Europeans are envious of the US VLBA (Very-Long-Baseline Array) project, which is now building ten 25-m dedicated radiotelescopes operating in nine frequency bands between 1 metre and a few millimetres.

From the outset, VLBI techniques have been especially valuable in mapping the structure of distant quasars and other active galaxies; Schilizzi says the recent observation by VLBI of extragalactic water and hydroxyl masers offers a chance of constructing an independent and objective distance scale for the Universe.

So, with all that promise, why are people so glum? The difficulty is that the analysis of VLBI data is becoming steadily more complex — and expensive. Collaboration requires that each observatory should have a decent clock and a more than decent tape-recorder.

With the development of millimetre-wavelength telescopes (which improves the resolution of the system), recorders must be capable of storing huge amounts of data — 512 megabits a second is the new standard, which is roughly the information content of 100 standard video signals. But then it is necessary centrally to correlate up to 20 of these recorded signals electronically, which means synchronizing and then multiplying together each pair of signals from the contributing observatories.

The 18 million ECU for which the European Consortium applied last year would have been spent on the development of the tape-recorders and the correlator followed by their installation at Dwingeloo. The consortium points out that the only correlator in Europe at present capable of dealing with millimetre-wavelength signals is that at Effelsburg, which can handle signals from only three independent telescopes and which is, in any case, fully extended.

Schilizzi says that it is essential that the project should cover the cost of providing each of 11 telescopes with a tape-recorder (and a spare). Otherwise, he says, national grant-making agencies would skimp on the cost, and the resulting non-standard equipment would yield signals that could not easily be compared.

There is a Euro-industry argument on the consortium's side: broad-band recording techniques and equipment will be in great demand as high-definition television gets under way. So why not put some millions of ECUs into the development of such machines, equip a score of observatories with them more cheaply than they could be bought and leave some European manufacturer with an expertise now lacking?

It seems generally agreed, even in Brussels, that the argument is appealing. People have plainly listened to it attentively — and have then decided that there is nothing they can do. But the last has not been heard of Dwingeloo's ambitions. ☐

ADVANCED STUDY

Monastic calm and money worries

Paris

JUST a 20-minute train journey from the centre of Paris in 11 hectares of parkland lies what has been described by its director, Marcel Berger, as "a monastery and a beehive" — the internationally renowned Institut des Hautes Etudes Scientifiques (IHES). The paradoxical metaphor is justified.

On the one hand, the institute provides the isolated calm necessary for profound meditation on theoretical problems, while the six permanent fellows last year attracted 872 researchers from 42 countries to exchange ideas in the vanguard of mathematics and theoretical physics.

Inspired by the Institute for Advanced Study at Princeton, IHES was set up in 1958 by Léon Motchane, Jean Dieudonné and Robert Oppenheimer as a European centre of excellence in mathematics and theoretical physics. The Second World War had seen some of Europe's most able scientists seek refuge in the United States; naturally, there were fears that the centre of gravity of science would move irretrievably across the Atlantic. In poetic justice, IHES stands on the site of a chateau commandeered by the Nazis during the occupation.

Very much like its Princeton model, IHES has a small number of permanent fellows on comfortable stipends for life — although mathematician René Thom is the first to continue to retirement so far, becoming an honorary fellow this year.

Fellows are free from all teaching and administrative obligations and do not have to account for their time, apart from an undertaking to spend 6 months of the year at the institute. In practice, they have catalysed revolutions in their specialisms. During the 1960s and 1970s, for example, the institute established itself as the world's temple of algebraic geometry, through Alexandre Grothendieck, Jean Dieudonné and Pierre Deligne.

Although fellows leave an indelible mark on the choice of themes, these have evolved over the years, aided by the presence of a handful of invited long-term visitors who stay for around five years, and a long line of visitors spending up to a year at the institute.

Today, the permanent fellows are Jean Bourgain, Mikhael Gromov, Louis Michel, David Ruelle and Dennis Sullivan. This year, theoretical physicist Thibault Damour fills a vacancy left by Oscar Lanford, opening a new avenue of research in general relativity and cosmology.

The institute's private status is anomalous, for 64 per cent of its FF19,287,000

($3.2 million) budget comes from the French Ministry of Education — an initiative started by President Georges Pompidou in 1965. Before that, IHES scraped along with relatively small subscriptions from a handful of business sponsors. But this year, only FF570.000 ($95.000) has been contributed by the private sector. Now, laments Marcel Berger, it is almost impossible to find money for basic research in industry. This has always depended on personal contacts established by the incumbent president, and can lapse when there is a change at the top.

Although genuinely international, IHES derives only 15 per cent of its income from European governments and is not eligible for European Commission support. Since 1971, the British Science and Engineering Research Council (SERC) and the West German Max Planck Gesellschaft have each given grants, this year of just over FF1 million ($166,000). The Swiss and Belgian governments have also supported IHES since 1971, together providing about 5 per cent of its income, while the governments of Ireland, Denmark, the Netherlands, Finland, Portugal, Israel and Brazil also make modest contributions (between $2,000 and $13,000). The US National Science Foundation (NSF) has supported IHES since 1985, this year giving $65,000. This grant, a rare gesture for NSF, reflects the large number of US visitors to IHES, by far the majority.

But money is becoming an increasing worry for the institute, which started the year in deficit. "The private status of IHES gives us great flexibility and autonomy", says Marcel Berger. "The fellows' stipends, while they cannot match those available in the United States, aim to free them from money worries, while it is possible to organize a seminar or arrange a visit at the drop of a hat."

But, with the library — a former music room — cracking under the weight of its books and needing expensive underpinning, Berger is having to buy time by leaving vacancies unfilled. An important ally has been found in the European Science Foundation which, since 1976, has carried out a five-yearly review of the IHES scientific programme. The panel's review helps guarantee the institute's autonomy, while ensuring that its high standards and international connections are maintained. That, in turn, makes governments — and, in principle, industry — happier to continue their support.

Berger says it is "unthinkable" that IHES would ever be threatened with closure. But if any of its sponsors, such as SERC, should be prevented by national government policy from helping, would suffer and its sometimes fragile occupants could once again become an endangered species in Europe. **P. C.**

SYNCHROTRON RADIATION

Grenoble as physics city

Paris

THE French city of Grenoble, near the Swiss and Italian borders, is, by a mixture of fate and design, becoming a 'Eurocity'. But unlike Brussels, Strasbourg or Luxembourg, Grenoble's cosmopolitanism stems not from politics but from a distinctive blend of unrivalled basic science facilities and new technology industry. The city's fourteenth-century university may already have had an international flavour, but twentieth-century physics has put Grenoble on the map of European science.

In 1946, the French national science research centre (CNRS) opened its first major laboratory outside Paris in the city, with its Service National des Champs Intenses. In 1956, the French atomic energy commission (CEA) chose Grenoble for its research establishment and in 1966 the Institut Laue-Langevin, which houses the world's highest-performance neutron-beam reactor, joined the family.

This year, construction has started on the latest, and most European, of Grenoble's big science instruments — the European Synchrotron Radiation Facility (ESRF). The idea that Europe should build its own major synchrotron facility was first put to the European Science Foundation in 1975. There followed a period of diplomacy, definition and costing until, in 1985, the two major promoters, France and West Germany, proposed to go ahead with the project.

At the end of 1985, a memorandum of understanding was drawn up between France, Germany, Great Britain, Italy and Spain. In 1987 the protocol was signed, with Switzerland and a Nordic consortium joining the original five members. The formal convention and statutes alloowing money to be spent was signed in Paris on 16 December last year.

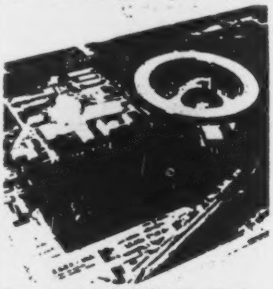
At present, the site is being excavated, but, says Karl Witte, assistant to ESRF's director (Ruprecht Haensel), "you can already see a few circles on the ground". The first seven of ESRF's beam lines are due to be opened in 1994, with a target date of 1998 for the full 30 planned. When completed, ESRF will be the world's most powerful radiation synchrotron, able to accelerate electrons or positrons up to 6 GeV, with a beam width of about one tenth of a millimetre.

But the title may quickly be lost. A 7 GeV synchrotron is to be built at the Argonne National Laboratory in Illinois and, last December, the Japanese government announced plans for a 8 GeV synchrotron facility near Osaka.

The total cost of ESRF will be FF2,600 million (about $406 million), with operating costs for 1994–98 estimated at FF1,000 million. France is contributing 34 per cent of the cost, and in addition has supplied the site and the local infrastructure. West Germany is the second largest partner, with a 24 per cent stake, followed by Italy (14.5 per cent) and Britain (12.5 per cent). The balance will shared between Spain, Switzerland and the Nordic countries (4 per cent each) with Belgium providing 3 per cent.

Last month, at the first ESRF users, meeting, 200 Europeans and a handful of colleagues from the United States, Japan and Israel, discussed priorities for the first seven beam lines and verified that the synchrotron's specification (called the 'red book') is still appropriate. Discussions will continue until the scientific advisory committee meeting at the end of June.

Although ESRF still has only a skeleton staff, there are already signs that it may be difficult to achieve a mix of nationalities in the resident staff (on five-year fixed contracts) which reflects members' relative contributions. "We wanted to keep the French presence below 50 per cent", says Witte, but the proportion seems now to be about 52 per cent. The difficulty is that it is not easy to attract scientists and technicians from other member states because ESRF can offer only French salaries in line with those of the CEA. Constitutionally, ESRF is a French company and in that respect unlike, for example, CERN, where salaries are fixed on the international European scale.


A model institute, but building is under way.

More than 2,000 people are expected to use ESRF each year, with all costs paid for out of member states' contributions. Experiments will be selected on the basis of merit by a scientific panel on which each member state will be represented. If a "significant imbalance" emerges between a country's rate of use of the facility and its percentage contribution, the statutes provide for an eventual retrospective "readjustment" of payments. This principle may free referees assessing proposals for using the machine from the straitjacket of national time-sharing quotas. **P.C.**

HIGH-ENERGY PHYSICS

Europe's most influential and costly collaboration

Geneva

CERN, the European Laboratory for Particle Physics whose new name does not match its old acronymn, seems always to be celebrating something. A few years ago, it was the successful production and identification of the particles called the Z and the $W^\pm$ whose existence put the cap on the unified theory of electromagnetic and weak nuclear forces due severally to Salam and Weinberg.

This year, CERN will be celebrating the commissioning of its latest accelerator, called LEP (for large electron–positron storage ring).

With just a few months to go to completion, LEP seems already assured of success. The tunnel (with a circumference of 27 km) has long since been complete and the magnets which keep the two counter-circulating beams installed. One section of the storage ring has been tested for fidelity with real electrons. The hope now is that it will be possible to put electrons and positrons into circulation soon after midsummer and that the first physics will be done early in the autumn.

The most striking feature of the way that people talk about this prospect is their confidence. The underlying assumption is that every project to build a particle accelerator that CERN touches turns out successfully. Certainly this has been the laboratory's record since the late J.B. Adams, as director, built the machine called the Super-Proton Synchrotron (SPS) and began on the task of building LEP.

The immediate objective is to collide beams of electrons and positrons circulating in opposite directions in the same vacuum chamber and each carrying 55 GeV of energy. Apart from the gigantic scale of the construction, the technical difficulties are those of shaping the counter-circulating beams of electrons and positrons and controlling the position of the particles both in space and time. The particles travel in bunches and are meant to coincide in space and time at the eight points around the ring at which collisions are meant to take place.

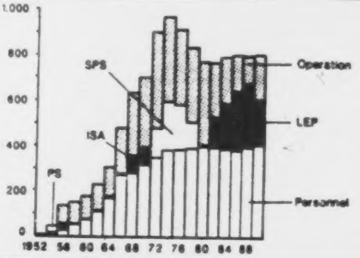
Science in Europe

This brief survey of collaborative research in Western Europe has been compiled by Steven Dickman (Munich Correspondent), Peter Coles (Paris Correspondent), Peter Newmark (Deputy Editor), whose contributions are attributed, and John Maddox (Editor).

The objective has been to illustrate by means of examples the manner in which collaborative research in Europe is undertaken rather than to provide a comprehensive survey of the institutions involved, and of their objectives. ☐

With this energy, colliding pairs of electrons and positrons should yield copious numbers of the heavy bosons required by the electroweak theory, allowing the properties of these particles to be defined in detail. But there is also a scheme for making a more powerful machine of LEP by substituting superconducting cavity oscillators for those now meant to supply LEP with power. The result would be, perhaps by 1995, a machine capable of colliding 100 GeV electrons and positrons.

The scale of this project is quite breathtaking. The surface of the site shows no sign of the storage ring, which is in places 100 metres or so underground despite the way the ring has been tilted from the horizontal (to minimize excavation costs). Getting to a particular experimental hall requires a journey in a vehicle through the rural lanes of (mostly) France and Switzerland, where agriculture continues undisturbed.



CERN's total expenditure, 1952–91 at 1988 prices. For the past decade the budget has been constant.

The hall that houses the planned experiment called Delphi is really an underground cavern 30 metres high which, last month, was buzzing with people threading power and data cables through the proper positions in the harnesses designed for them as if they were acrobats building a cocoon of cable for a mechanical monster lost underground (see this week's cover). Half-way up the detector being assembled are the ports that will deliver coincident bunches of electrons and positrons simultneously to the centre of the detector.

That is the heroic face of CERN, which is also, by being the most costly of all international collaboration in Europe, also one of the most controversial. More accurately, that has been how it has seemed from Britain in the past few years.

In 1984, it was decided that there should be a formal examination of continued British membership of the international high-energy physics community (carried out by a group under Sir John Kendrew), a further examination under the eye of the CERN council of the efficiency of its operations and, finally, a decision that British membership would continue, at least for the time being.

It is understandable that the workforce at Geneva (about 3,500 strong) should feel slighted by these signs of less than full approval. They are quick to point out that, as high-energy physics laboratories go, CERN is cheap, with a budget of just over 800 million Swiss francs a year out of which it must pay for the physical of cost of building LEP (roughly SFr1,200 million since construction began in 1981).

In reality (see figure), CERN has been required to live within a fixed budget since the beginning of this decade. In the process, it has become expert at cannibalizing its existing machines. Electrons and positrons for LEP, for example, will be given their high energy by first circulating them through the oldest machine in operation at the site (a proton synchrotron) and then through the SPS (giving them a total energy of 20 GeV) before they are fed into the larger LEP ring for final acceleration and storage.

A bizarre prospect for the more distant future is that, at some stage, the same cascade of accelerators may also be used for the purpose for which they were designed (accelerating protons or antiprotons) with which to fill a companion hadron storage ring in the same LEP tunnel. Since the two booster synchrotrons also have other functions on the site, the planning of what kinds of particles are delivered to which experimental rigs in what sequence threatens to become a planners' nightmare.

The Large Hadron Collider, the scheme for equipping the LEP tunnel with a second circular vacuum chamber for storing counter-circulating protons and antiprotons, is for the time being only a possibility. For one thing, the 14 full member states have not approved the scheme (which, with its superconducting magnets, would cost "1.5 LEP").

In any case, physicists would prefer to see what LEP itself produces before linking their ambitions to a particular successor. Some choices, the possibility of building opposed electron and positron colliders, for example, might make it necessary to leave the cramped site at Geneva.

On the face of things, CERN can thus see the way forward until the end of the century, which will amount to roughly half a century after its foundation (at a meeting organized by UNESCO in 1951). What, by then will it have accomplished?

Judgements of this kind are necessarily subjective. From the start, CERN has been most notably a European citadel of technical expertise, both in the construction of scientific instruments on a huge scale and in the development of fast data networks and communications interfaces for the handling of the data it produces.

While there is a sense in which CERN would be a pale shadow of its present self had it not been for the discovery of the Z^0 and the $W^\pm$ mesons, that slights the importance of the growing range of general physics that pours out of Geneva each year, from the precise determination of the gyromagnetic ratio to the fabrication of atoms of antimatter.

Luck has helped. At the outset, with nuclear physics riding high and not easily distinguished from high-energy physics, CERN enjoyed the enthusiastic backing of powerful figures in Britain, France, West Germany and Italy. But by being consistently more cosmopolitan than its membership (with deliberate policies of forging links with Soviet and US physics), it has won and kept a place in international high-energy physics. In the process, it has become a free-standing centre of excellence whose connections run through the whole of Europe. There are many projects on which Europe spends 800 million francs a year without anything like the benefit. ☐

CARLO RUBBIA

New machinery on the horizon?

Geneva

Carlo Rubbia is a tall man with a stoop who became director of CERN at the beginning of the year, after helping to put the institution on the map by finding the intermediate heavy bosons (and being awarded the Nobel prize for physics in 1987). He seems to have thrown himself into his new job with high-energy diplomacy, talking to the high-energy physics communities elsewhere, notably in the United States.

Rubbia is in no doubt that CERN is technically more excellent at the craft of building particle accelerators than either the United States or the Soviet Union. He points to the high estimated cost of building the SCSC in Texas, probably in excess of $4,500 million, and to the difficulties (now resolved) of grafting onto the Stanford Linear Accelerator a device for colliding electrons at high energy.

But Rubbia also acknowledges that accelerators cannot keep on growing as they have been, and that the time must come when accelerators are built in a wider framework than in the past. Whence the diplomacy.

The strategy is to keep CERN in the forefront of high-energy physics while arranging that member states in Europe do not have to meet all the extra cost. Rubbia claims that Geneva has the world's only permanent team of accelerator designers and builders whose success has been established by demonstration. Will not others wish to join in collaborations with them, not just for physics but for construction?

One intriguing possibility is that future members in large consortia might make contributions in kind to future projects. There is even talk that the Soviet high-energy physics laboratory at Serpukhov, which is already fabricating superconducting magnets for its own new proton accelerator, might carry on making magnets for the Large Hadron Collider at CERN when its own needs have been met. Rubbia will make partnerships with anybody, on any favourable terms, to see the next generation under way.

But what would happen CERN if good sense required that the next machine should be built, perhaps by a larger consortium, elsewhere? Rubbia notes that the present machines will have life left in them at the turn of the century, and that diversifying of present interests could also provide continuity on the Geneva site. But that is Rubbia's cautious side. The chances that he will be making a fierce fight for some new machine at Geneva a few years from now. ☐

Rubbia stresses CERN's ability to build accelerators.

ESF

Small but a powerful membership

London

The European Science Foundation (ESF), based in Strasbourg, is the smallest but one of the most interesting of all European collaborations. It has a budget of its own amounting to less than FF14 million a year, but its influence is much greater than its budget would normally command.

The explanation is that ESF's members are neither people nor governments, but public grant-making agencies in European states. From West Germany, for example, both the Max-Planck Gesellschaft and the Deutscheforchungsgemeinschaft (DFG) belong. All five of the British research councils as well as the Royal Society are members. Altogether, there are 50 members from 18 European countries, Finland and Turkey included.

In practice, what this means is that a project which is backed in Strasbourg is likely to win a sympathetic hearing when its advocates later take the hat around asking for substantial funds to supplement whatever seed money that ESF may have provided.

Perhaps the most striking illustration of this successful way of working is the launching of the European Synchrotron Radiation facility, now being built at Grenoble (page 721). The project first surfaced about a decade ago as a recommendation of an ESF committee consisting of accelerator physicists and potential users.

ESF knew the cost would be beyond its scope, but reckoned that it could carry out the diplomacy required to build a consortium of its grant-making members to launch the project, which has now successfully been done.

Another ESF-originated programme is the European Geotraverse, a project for the geophysical investigation of the Earth's crust along a line from Scandinavia to north Africa.

Latterly, ESF has been spending much of its budget on supporting networks of research with funds with which to organize meetings and regular visits among themselves. At the same time, it appears to have accepted that the time has come to grow. ESF's director, economist Michael Posner, is working on a "forward look" that would multiply ESF's budget by three or even five.

The foundation has also appointed a new president to take over from Professor Eugen Seibold, whose term ends in 1990. Professor Umberto Colombo, chairman of Italy's Nuclear Energy Agency, will take over in November 1990. ☐

MOLECULAR BIOLOGY

One of the better models of European cooperation

Heidelberg

LENNART Philipson, an imposing Swede, is particularly proud of 'The Operon', the new 320-seat auditorium at the European Molecular Biology Laboratory (EMBL). It symbolizes his drive, as director general of EMBL since 1982, to fulfil one of the original aims of the 15-year-old laboratory — that it should be a European centre for teaching and training in molecular biology, particularly for the benefit of the smaller countries that help pay the cost.

Training, however, was only one of the main roles foreseen for EMBL by those who argued 20 years ago for its foundation. They also claimed it would act as a meeting-place for senior European molecular biologists (as Cold Spring Harbor does for US biologists and CERN for European particle physicists), a provider of specialized facilities that would be beyond the means of most European countries (again like CERN), and a focus for molecular biology that could help to disseminate the techniques throughout Europe. Critics at the time argued that specialized facilities and large laboratories would funnel molecular biology and its practitioners into an elitist group of little influence on the development of the science in Europe.

With its training role to the foremost, EMBL now hosts annually a dozen practical training courses, most of them run by its own staff, and takes on about ten predoctoral students, whose quality is said to be exceptional. They take their places alongside the 120 or so postdocs who are present at any time, in a laboratory that is demonstrably European to judge by the mix of nationalities of the scientific staff.

But Philipson argues that the training functions of EMBL are much more extensive. With almost all the scientists employed on short- or medium-term contracts, there is no elitist group. Rather, youngish scientists are given an opportunity to make their scientific mark during their most productive years, before dispersing, often to their country of origin, as trained leaders with a European attitude.

The other side of that coin is less bright with such a turnover of even its better-known scientific staff. EMBL has some difficulty in building up and sustaining a reputation as an outstanding laboratory, which is what many of its critics think it should be for its size — about 500 people, of whom half are on the laboratory staff — and cost — now about £17 million a year.

At times, this has led one or other of the countries that foot the bill for EMBL to threaten to withdraw. The biggest threat, which ran thoughout 1983, came from Britain, but ended when a Medical Research Council review of the laboratory concluded that the British contribution could not have purchased equivalent work of equal quality within Britain.

In fact, no country has withdrawn its support from EMBL, and several more have joined in recent years, although Ireland, Iceland, Portugal and Belgium remain unpersuaded. Of these, only the Belgian contribution would make a noticeable addition to EMBL's budget. If Belgium joined there would be funds to occupy the last remaining space at EMBL — a floor of the brand new wing that houses 'The Operon'.

The same wing already houses the Biocomputing Programme, which recently became the seventh research programme at EMBL and which is, in many ways, just the kind of activity in which a European laboratory should be engaged.

On the one hand, it is an attempt to build a substantial research programme in an area of science — theoretical and computational biology, particularly in relationship to proteins and nucleic acids — in which Europe needs urgently to invest. But that is why it is disconcerting that EMBL is finding serious difficulties in recruiting experienced group leaders.

On the other hand, the Biocomputing Programme includes the EMBL Data Library, which shares with its US and Japanese counterparts the unenviable tasks of feeding emerging DNA sequences (27 million bases so far) into a database and then making it accessible worldwide. The former task is being eased because sequences are increasingly being deposited directly in the library, and the latter by the advent of EMBnet, which will be able to provide access to the current library through national European computer nodes on a DecNet-based network.

Even so, the accelerating rate at which new DNA sequences are being produced means that EMBL will not for long be able to support or even house the data library. Already, the European Commission supports 40 per cent of the activity, but only for two years in the first place, and Philipson is pushing for the foundation of a separate European institute (of bioinformatics, or some such) eventually to handle the library and its functions.

Of EMBL's other research programmes, those known as Gene Expression, Differentiation and, especially, Cell Biology have established reasonable international reputations. The Biological Structures programme, while still struggling to achieve equal footing, is said to be in better shape than it has been.

Meanwhile, the Physical Instrumentation and Biochemical Instrumentation programmes are in danger of disappearing as a matter of policy. Stemming from the original conception of EMBL as molecular biology's counterpart to CERN, the development of instruments has always been one of its missions. Pursued somewhat in a vacuum by the founding director, (now Sir) John Kendrew, instrument development has been much more closely tied to biological programmes by Philipson, who now plans to integrate them completely.

This plan, like other major policy changes at EMBL, is subject to the approval of the laboratory's governing body, the council, which comprises delegates from each contributing country and is advised by a scientific committee. As director general, Philipson is responsible for planning and execution of approved scientific programmes at EMBL, assisted by a committee of staff members.

EMBL also operates two outstations, both with an uncertain future. For that at the Institut Laue Langevin in Grenoble (see page 723) the problem is that neutrons have not turned out to be particularly useful for biologists. Grenoble, however, is the site chosen for construction of ESRF (the European Synchrotron Radiation Facility, see page 723), which will be much more useful, and where EMBL has been asked to provide a biological research support laboratory. If EMBL agrees, the days (or, rather, years) of the second outstation at DESY (the Deutsches Electronen-Synchrotron) in Hamburg will be numbered.

Until a few months ago, Philipson had not expected these problems to be his. But after the pathetic failure of the EMBL council to find a new director (see *Nature* 337, 397 and 589; 1989), he will stay until 1995 rather than leave in a year's time.

Perhaps for that reason, and tired of being on the defensive about EMBL as well as confident that the laboratory provides much better value for money than Community programmes, Philipson is now strongly promoting the idea of founding more EMBLs, for example, one devoted to plant biology and another to neurobiology.

Peter Newmark

Top men at EMBL (Philipson, left) and EMBO (Tooz

EMBO

Workshops to postdocs and publishing

Heidelburg

IN contrast with **EMBL**, it is hard to find anything but praise for its original parent, the European Molecular Biology Organization (EMBO), which distributes fellowships, finances workshops and practical courses and now produces the *EMBO Journal*.

EMBO celebrates its silver jubilee this year. Its first grant was a small one from Israel, which to this day qualifies as a European state both for EMBO and EMBL. That was followed by a substantial grant from the Volkswagen Foundation. Finally, in 1969, an intergovernmental agreement established the European Molecular Biology Conference, the body through which EMBO's (but not EMBL's) funds are still provided. With Portugal soon to join and Belgium contributing unofficially, EMBO has a full house, and an annual budget of nearly £4 million.

The membership is drawn, somewhat unselectively, from the ranks of European molecular biologists. But the keys to its success are the select committees and reviewers, who decide which applications to support, and John Tooze, EMBO's executive secretary. Tooze also manages to edit *EMBO Journal*, act as scientific co-ordinator for EMBL and carry out research (four papers in *J. Cell Biol.* in 1987).

The greatest pressure on EMBO's budget is for long-term fellowships supporting postdoctoral fellows for 1–2 years in a country other than their own. Demand for these fellowships has increased greatly in the past five years, but plans to meet it were somewhat thwarted by British penny-saving in 1986, when EMBO's existence was guaranteed until 1995 and its budget set until 1991.

As a result, only about 30 per cent of the new applications for long-term fellowships could be financed last year, while about 40 per cent deserved support, says Tooze. Nevertheless, 142 new awards were made, together with 69 renewals of one-year awards for a second year.

Awards, Tooze emphasizes, are made strictly according to the quality of the application. There is no attempt to distribute some of the awards to each of the countries contributing to EMBO's budget — last year, 40 per cent of the new long-term EMBO fellows were working in US laboratories.

Of the original plans for EMBO, only the idea that it should award research grants remains unfulfilled. There are those who believe the time is right to start pressing for EMBO to be allowed to build on its success in that way. **P.N.**

HUBERT CURIEN

Portrait of a European

Paris

HUBERT Curien is a European enthusiast. Perhaps more than anyone, this modest 65-year-old French physicist, who is also research minister in the Socialist French government, has accompanied European science and technology in its trajectory from a collection of national initiatives towards true collaboration.

The European Science Foundation (ESF) and the European Space Agency (ESA), along with the European Commission's EUREKA and PACE programmes, CODEST and, most recently the Academia Europaea, have each benefited from his innovative flair and enthusiasm.

Although he has been president of both ESA and ESF, Curien was first of all an ambassador for French science through his research on crystals and even has a new mineral, 'curienite', named after him. He has been director of the French national science research centre (CNRS) and president of the French national space research centre (CNES). He became Minister for Research and Technology in the 1984 Fabius government until the 1986 elections brought the opposition conservative party to power. In June last year, he once again became Minister for Research and Technology in the new Rocard administration.

Ministère de la Recherche et de la Technologie

Curien — urbane, optimistic and idealistic.

Looking back on the past 30 years, Curien acknowledges that personal contacts between scientists inspired the creation of the first European organizations. "European countries did not know each other well in the 1960s", he says. So it was as a result of informal contacts between colleagues such as Curien, Lord Flowers and Reimar Lust that the European Science Foundation and ESA got off the ground. "Now", he says, "we know each other better" and there is a European synergy arising from the various organizations and forums that have been established.

Historically it was through the creation of joint large scientific instruments, such as CERN, that European scientists found they could buy their own cake and eat it, without having to be guests at the table of US colleagues. Other examples have followed, including the European Southern Observatory and the European Synchrotron Radiation Facility. But for Curien, European collaboration in science and technology means more than sharing expensive facilities. It is also a matter of bringing scientists together, not only to exchange ideas, but to influence policy.

"If thinking comes from the bottom and the money from the top, people at the bottom find themselves in a very happy situation, and as it is the people at the bottom who do the work, it is better if they are heard", Curien said in his keynote address at the foundation of the European Academy last year. And this 'bottom up' approach is the hallmark of initiatives in which he has played a central role.

EUREKA, Curien's brainchild, provides for trans-frontier technology collaboration where the projects are marketled. Similarly, CODEST, the European Commission's (EC) Committee for European Development of Science and Technology, is a platform for specialists to influence policy, while the proposed EC Assembly, due to be debated this year, will give 200 academics a voice in Brussels.

Perhaps because his own roots are still in the laboratory, Curien knows that the whole is also composed of parts which can easily find themselves isolated. It was he who first proposed the idea of 'networks' of laboratories as an alternative to the 'lame-duck' idea of European centres of excellence. Since 1974, 20 networks have been set up in specific disciplines, largely through ESF.

Now, as Europe finds its stride, Curien sees a danger that countries such as Greece and Portugal will find it difficult to keep up. "European cohesion can easily be opposed to excellence", he says. In areas at the vanguard of science and technology, he says, poorer countries may lack the facilities or trained researchers to take part. But if Europe opts for cohesion and drops these projects, the best are brought down to the level of the least good. For Curien, one way to achieve cohesion and excellence is through education.

The EuroPACE satellite teaching programme for continuing education, of which he is president, is one means to achieve equality of skills. He also wants to see more part-time posts in universities to allow researchers from poorer countries to keep a foot in good laboratories while raising standards at home.

Urbane, optimistic and idealistic, Curien continues to seek ways in which European collaboration can improve. "We cannot imagine Europe continuing as it is now. It must be more coherent." But, he adds, "with patience you can always get what you want". **P.C.**

SCIENCE IN EUROPE

COMMISSION SCIENCE

What kind of bureaucracy is Brussels?

Brussels

EUROPEAN science is scattered over a score of countries: why look for it in Brussels? Because the European Commission, the executive arm of the European Economic Community (EEC), is there and has an increasingly important if controversial influence on the shape of things.

But who wants European science to be run by a bureaucracy? The question is often asked, much to the distress of the Commission's staff, whose members believe "bureaucrat" to be a pejorative term. This brief constitutional history of the EEC may put the question in a broader context although without altogether removing the slur.

The Treaty of Rome, signed in 1957, on the model of the US Constitution, defines a kind of European government with three arms — an executive (or administration) which is the Commission, a supreme court (the European Court of Justice) and a legislature (the equivalent of the US Congress). But the likeness between Brussels and Washington is only formal, chiefly because the political equivalent in Europe of the US Congress is a bastard blend of representation by member governments and by the directly elected European Parliament (which is not in Brussels at all, but at Strasbourg or Luxembourg according to the season of the year).

Much of the long-standing and broad argument about the future of the EEC turns on questions of how the Commission should be controlled politically. At the outset, the Commission was the servant of the Council of Ministers, which for practical purposes is a committee of national ministers chosen (by the governments they represent) according to the nature of the issue to be decided — agriculture ministers decide agricultural issues; prime ministers or their equivalents (plus retinues) attend the biannual meetings of the council proper, organized by whichever country has held the chairmanship of the council for the elapsing half year.

Originally, the council and its subcouncils were expected to reach decisions by consensus, which meant that each national government could veto the wishes of its fellow-members. Now, under the European Single Act of 1986 (whose most important effect is to promise the operation of a genuinely common market by the end of 1992), consensus is required only on decisions of a largely constitutional character (including the extension of EEC membership).

The sphere of influence of the European Parliament is still evolving, but is comparable with that of the House of Lords in the British constitution. It is asked to approve the EEC budget each year (and can delay its consent), is consulted about issues bound for a decision by the council, can raise specific issues (complaints at the effect of Commission decisions on member states, for example) and can draw up and approve reports on broad policy questions (as on environmental issues) which, although not binding on the Commission, are regarded seriously in Brussels.

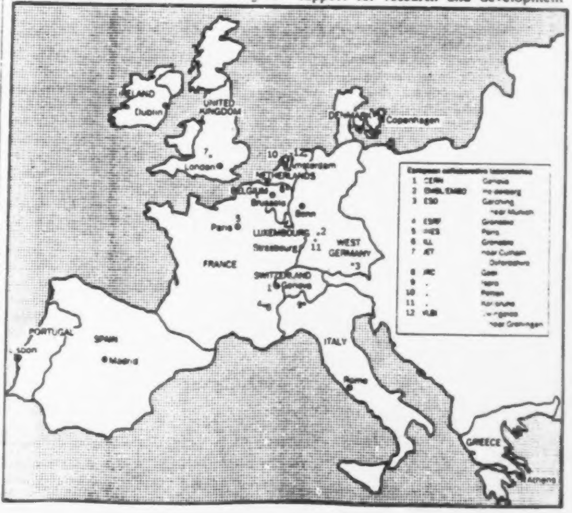
European federalists naturally look forward to a time when the influence of the European Parliament will have so grown that national parliaments have no more than the importance of state legislatures in the United States. Others, and governments such as the British, have a different view of the future.

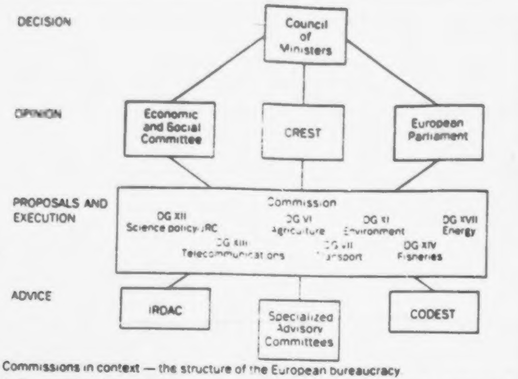
Constitutionally, it is a plain fact that the Treaty of Rome, even as amended by the European Single Act, does not compromise the sovereignty of national governments in the fields of defence, economic (as distinct from trade) policy and foreign affairs. Such forms of collaboration as there may be in these areas are voluntary. Similarly, the Commission's writ does not run to educational policy, either at school or university level, although there is a newly appointed 'task force', run by Welshman Hywel Jones, seeking to define educational issues to be tackled.

It is also relevant, not merely to the constitutional limits of the Commission's own powers but to its own independence, that commissioners are appointed (and may be removed at the end of their five-year terms) by national governments individually. In office, commissioners function corporately as if they were the cabinet of an administration, but are also given charge of specific portfolios (areas of responsibility); each runs one of the Commission's departments, headed by a director-general, who is in turn responsible for a section of the Commission's staff (most of whom are also seconded to Brussels by member governments).

The Commission's independent powers (comparable in many ways to the now-truncated power of the US administration to make war) stem from the provisions of the Treaty of Rome requiring that member states should compete with each other on equal terms. The undoubtedly proper exercise of these powers is nevertheless one of the reasons why the Commission has won a reputation for bumbledom: its directives (on matters such as the definition of particular foodstuffs), which have the force of law in all member states, seem to arouse most derision. Much of the Commission's regulation of environmental standards derives from the same power.

It seems not to have been remarked that, in principle, the Commission's powers to require equal competition would allow it to regulate government support for research and development





Commissions in context — the structure of the European bureaucracy

directed towards the support of its domestic industries.

So far, the Commission appears rather to have concentrated on the development of its own research policy, which is at present a corporate issue spanning at least three of the directorates-general — those responsible for research, industry and environment. Of these, that responsible for research, known as DGXII (pronounced "Dee-Gee-Twelve") plays a crucial role, both as a prime mover behind the five-year 'Framework' programme now half completed, and as the small and only source of support for basic research.

So how fair is the charge of "bureaucrat"? There is no simple answer. But the popular European view that Brussels is filled with a huge army of civil servants bent on interference is wide of the mark. The staff of 17,000 might be held to be small, given the need to administer such a variety of policies in a dozen countries speaking eight acknowledged languages.

The legalism of the Commission's procedures, especially in the drafting of its directives, is probably unavoidable given their force as trans-national legal instruments. The triviality of some of the issues dealt with (the definition of ice-cream, for example) probably reflects the influence of parochial lobbies (to which Brussels is prone), but might be avoided by clear-headed forward planning.

No doubt the directorates-general differ, but first impressions do not suggest that the senior people have a bureaucratic caste of mind. Many of them are Europeans impatient for more rapid progress towards a united Europe. Within a directorate, at least, there is also room for flexibility: DGXII, for example, is frequently able to make small grants of money to help organize meetings on issues that may lead to some collaboration. Nor do the Commission's dealings with the outside world fairly suggest that armies of pernickety people have deliberately designed forms so complicated as to deter respondents from completing them. On the contrary, the Commission's more common failing is that too much of what it does is done with too much haste, often reflecting people's eagerness to see that money is spent as soon as the appropriate budget has been approved.

Yet there is a sense in which Brussels is a bureaucracy in the worst sense, perhaps unavoidably. The Commission as a whole does not have the flexibility, enjoyed by elected governments, to second-guess their electors, shifting resources in this direction or that as circumstances change. Line-item budgetary control is implicit in everything its political masters allow it to do. Worse, the commission's own procedures are not as coherent as they should be.

For such a young organization as the Commission (or perhaps precisely for that reason), the directorates-general are surprisingly jealous of each other's powers of decision. This is the mechanism by which the Commission appears frequently to reach nonsensical and corrosive decisions on questions such as the use of hormones in growing beef cattle; the power of decision lay with those responsible for agriculture and environment, who chose not to consult those in DGXII who would certainly have known better.

The question whether Brussels might arrange to seem less bureaucratic is a question of its own deportment. Of necessity, the mostly intelligent and frequently idealistic people working for the Commission differ from those working for national governments in their conviction that the destiny of Europe is to be united. They naturally regard the member governments as entities that must be helped, and sometimes hectored, to share the same vision; with the passage of 30 years, their signature of the Treaty of Rome seems to count for little in Brussels now. Could that be why there seems always to be at least one, and sometimes several, among the member governments which is or are uneasy with the process they began? □

IMITATIONS

Those things that the EEC is not

London

Post-war interests in cooperation have littered Europe with international organizations which are often confused with the EEC. Here is a brief guide to them:

- The Council of Europe is a strictly European organization meant to foster collaboration in the fields of law and social policy (which may include, for example, the regulation of research). There are now 26 members. Its chief functions are to negotiate international conventions, which have the force of law in member states; the best-known is the Convention on Human Rights, signed in 1950, accompanied by a European Court of Human Rights which hears complaints by individuals against their governments on the recommendation of the European Commission on Human Rights. The council's headquarters are in Strasbourg.
- The Organization for Economic Cooperation and Development or OECD began life as the Organization for European Economic Cooperation. The name was changed in 1961 with the accession of the United States and Canada and, at a later stage, Japan and Australia. Outside the field of economics, OECD has a section of science and technology best-known for its collections of statistics on scientific manpower and spending and for its occasional reviews of national science policies. OECD also operates the Nuclear Energy Agency and the International Energy Agency. The organization is based in Paris.
- The Western European Union is a treaty between seven governments, including Canada and the United States, which among other things is the forum in which the West German government has undertaken never to make nuclear weapons and in which Britain and the United States have undertaken to maintain armed forces in mainland Europe. The headquarters are in London.
- EUREKA is the organization set up on a French initiative in 1985 to arrange for European collaboration on the development of marketable products. Originally advocated as a mechanism for stimulating European industry because, at the time, it was suspected that US industry would be stimulated by the Strategic Defense Initiative (SDI), Eureka now has an administration based in Brussels □

SPENDING MONEY

Budget an endless bone of contention

Brussels

By the standards of many governments which are members of the EEC, the Commission has a substantial budget for research. In the five-year period ending with 1991, the Commission will have been spending roughly 1,500 million ECU a year, but the research people at Brussels are now excited by the prospect that their collective budget will be increased to 2,500 million ECU a year from about now.

Even at the present level of spending, the Commission's research budget is, in round numbers, virtually on a par with what Britain calls its Science Budget, spent through the research councils on university and in-house basic research. It is also roughly equivalent to the combined federal subventions in West Germany of the Max-Planck Gesellschaft and the Deutsche Forschungsgemeinschaft. But officials here insist that their budget is roughly 4 per cent only of total European spending on research.

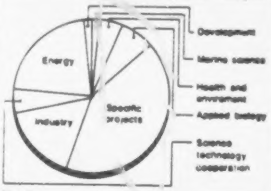
The prospect that there will now be an increase seems to be a little-noticed consequence of the budget agreement in the closing days of 1988 at which member governments agreed that there should be a further squeeze on the cost of supporting European agriculture. As yet, there are no firm plans for spending the extra money. (There are a few suggestions elsewhere in this section of *Nature*.)

This is a far cry from the second half of 1986, when it seemed as if the British government would carry its opposition even to a reduced programme to extreme lengths. Earlier that year, the British and West German governments had objected both to the scale and the character of what the Commission calls its "framework" programme. Even after the West German position had been modified, the British government persisted with its opposition, acquiescing only after 1988 had begun.

Curiously, direct authority for the Commission's research programme derives only from the Single Act signed in February 1986, which leaves the Commission in no doubt of its responsibilities. The chief task is to strengthen European industry and to help make it more competitive. Roughly 42 per cent of spending in the current programme is under the heading of "Towards a large market", most of it in telecommunications, but 100 million ECU is set aside for traffic and travel projects. Energy (22 per cent), industrial modernization (16 per cent) and applied biology (5 per cent) consume a little more than that (see figure).

The general way of working in the industrial field is that the Commission offers research and development grants on a 50:50 matching basis to consortia of industrial companies or other organizations (such as universities and national government laboratories). A precondition of an award is that the partners must be drawn from at least two European countries. The best-known of these programmes is the telecommunications programme, ESPRIT, on which 2,350 million ECU will have been spent between 1986 and the closing months of 1992.

But the Commission also has research projects which are more particularly its own, outstanding among which is the controlled (and high-temperature) thermonuclear fusion programme whose chief embodiment is the JET (for Joint European Torus) thermonuclear tokamak device in Oxfordshire, England. This programme will have cost the EEC more than 1,200 million ECU over six years by the time the present phase comes to an end in 1991. (The Commission meets 80 per cent of the total cost.) The design of the next machine, called NET (for Next European Torus) is under way but a decision on its construction (and even siting) has yet to be made. The Commission also contributes to the cost of some national thermonuclear programmes as at Garching (West Germany) and Frascati (Italy).



The Commission's current research spending.

More contentiously under the Commission's own control are the laboratories grouped together under the name Joint Research Centre (see page 732), mostly inherited from the Euratom organization (which, like the European Iron and Steel Community, was one of the precursors of the EEC). There are four laboratories in Belgium (Geel), Italy (Ispra), the Netherlands (Petten) and West Germany (Karlsruhe), but the work is organized into nine divisions (called institutes), dealing with topics as different as transuranic elements (Karlsruhe), materials (Petten) and environmental safety (Ispra).

The centre's budget problems have their roots in EEC history. Euratom was conceived of as a research organization, but later acquired responsibility for the operation within Europe of safeguards on the use of fissile materials. When Euratom's member states were full of enthusiasm for nuclear energy, it seemed natural that the organization should be ready to build prototype reactors of all kinds, for which purpose research stations were plainly needed. But then the gilt disappeared from that gingerbread.

Ispra, the largest site, has been consistently the most troublesome. Now, after successive painful reorganizations, the laboratory is on the way to being a kind of European Standards Laboratory with responsibilities, on the side, for nuclear reactor safety and environmental safety issues. But the Commission's continued support of the Joint Research Centre was one of the causes of trouble in 1986.

By the standards of these expenditures, basic research comes a poor last (page 734). Spending on the relevant part of what is called the EEC's stimulation programme has been fixed at 167 million ECU over the five years to the end of 1992 (up from a total of 60 million ECU in the previous three-year period). Transnational collaboration is a precondition for a successful application, but matching funds are not required.

On the face of things in Brussels, there is general contentment with this pattern of spending. The common goal is to create the single market and somehow to arrange that it is competitive with the rest of the world. If there is a research programme, and especially a substantial one, is it not self-evident that it should be pointed in the same direction?

To outsiders, that logic may not be nearly as compelling. If, for example, the objective of the creation of the single market is that competition between companies should be free and efficient, without reference to their geographical location, will it continue to make sense that most forms of EEC research support should be devised so as to marry efficient companies with less efficient collaborators? And if the Community is concerned about its supply of skilled manpower, might there not be something to be said for strengthening the infrastructure?

Asking such questions in Brussels does not physically endanger one's person; indeed, people are very polite and are willing to acknowledge that they are questions that should be asked. But of whom? The Commission has problems enough on its mind, the European Parliament is preoccupied with the environment and bothered by the discomforts the single market will bring to its constituents. The main council (which meets only twice a year) will have horrendous political disagreements, such as that over monetary union, to resolve by 1992, while the subcouncil on research could hardly settle on a change of direction without approval from above. Yet it will be a pity for Europe's dreams to go unanswered because nobody has the time to listen to them. ☐

INDUSTRIAL RESEARCH

Sponsored research but with strings attached

Brussels

FOR the time being, the cornerstone of the Commission's effort in research is the conviction that European industry must be helped to be more competitive with the outside world, and that the sponsorship of industrial research is the best way of doing that. How well is it doing?

The best-known and the first major collaborative programme is that known as ESPRIT, intended when launched in 1984 as a ten-year programme of research and development in information technology, financed on a cost-sharing basis between the Commission and collaborating companies. (The Commission's share is more than 300 million ECU a year.)

ESPRIT inevitably became the model for later programmes. One of these, BRITE, is a cost-sharing programme aimed at improving the production technology and thus the competitiveness of small and medium-sized enterprises, SMEs in Eurospeak, on which the Commission has spent 175 million ECU on 230 projects since 1985.

The diversity of these programmes is widely remarked upon, as is the enthusiasm of those who take part. ESPRIT, for example, covers everything from the design of the semiconductor elements of computers to the development of software and hardware for desk-top publishing.

Out of the first of these interests has grown the programme called JESSI on the development of submicron computer chips (see *Nature* 337, 682; 23 February 1989). Garcia Aroyo, the DGXII director with responsibility for technological research, appears sanguine at the prospect that his colleagues will soon be labouring under 800–900 applications for funds to support industrial research in production technology and materials development. BRITE was merged with a parallel programme on materials development from the beginning of this year; the closing date for applications under the combined programme (on which the Commission will spend 500 million ECU in the next four years) is 12 May.

The rules are the same. Successful applications must involve industrial companies from more than one European country (and not more than two-thirds of the total grant can finish up in any one country). Companies must be genuinely independent of each other (which means that the collaboration cannot simply be a means by which one company and its subsidiaries elsewhere collaborate on work they might have done anyway). A small proportion of the funds (up to 7 per cent) may be spent on proposals by university consortia for generic investigations provided that the proposals are endorsed by industrial companies.

Projects must be original and preferably applicable in more than one industry. Interestingly, companies from countries in the European Free Trade Area (Norway, Sweden, Finland, Austria and Switzerland) may take part, but cannot receive Commission funds (and may have to contribute modestly to administrative costs). Research projects must be "pre-competitive". This time round, there is also a scheme for providing up to 75 per cent of the cost of a feasibility study (up to a maximum of 25,000 ECU).

This year's programme has plainly been much influenced by the report of an influential evaluation panel under Yves Farge, vice-president for research and development at the French company Pechiney et Cie., which reported last July. That panel, for example, recommended the merging of the BRITE and advanced materials (EURAM) programmes.

The Commission has also, in a late amendment of its proposals, followed the recommendation that universities collaborating in industrial projects should be recompensed by the Commission for the full cost of their work. (Under the old arrangements, industrial partners would usually pay the other half of the cost.)

Of the questions raised by the Farge committee, those implicitly answered so far are procedural in character. More fundamental issues are unresolved, conspicuously the panel's concern at what it called a "major contradiction" in the Commission's restriction of the programmes it would support to those judged "pre-competitive".

The principle is that the Commission will not support industrial development work leading directly to marketable products or usable processes, but only industrial research of a generic character on which more pointed research programmes can be based. The experience of the BRITE programme apparently showed that some "excellent projects" were not supported because they were judged to be "too competitive", but that the fear of falling into that trap pushed other applicants "upstream", with the consequence that the industrial interest of their projects was diminished. This complaint is also a dilemma for the Commission. Relaxing the pre-competitive rule would place the Commission in the position of providing direct support for commercial development by individual companies.

But the Farge panel points to the recent amendment of anti-trust legislation in the United States allowing research and development partnerships, and says that "the law should be the servant of the Community, not its master". The panel also complains that the Commission, in its management of its research programmes, has not been sufficiently explicit about its objectives.

More generally, the panel pointed out that it had not been able to put the BRITE programme "into perspective in a coherent approach to an industrial research and development policy". This criticism appears only partly to have been met in the new phase of the programme.

BRITE covered nine disparate fields such as computer-aided design (CAD) and production technology for flexible materials (mostly textiles). Its successor has only five broad headings, which may be thought a step towards the definition of a strategy. Three are aeronautics, advanced materials and design, quality and reliability. There are also subprogrammes for the application of known manufacturing technology and the development of novel techniques and processes.

The Farge panel was also concerned that the Commission's own judgement of which projects to support is excessively technical, and insufficiently informed by business considerations. (The Commission's technical staff do get high marks for competence and enthusiasm.) The consequence, the panel said last July, is that there was too much "technology push" and not enough "market pull" in the BRITE programme.

In the nature of things at Brussels, it is too soon to know how the next evaluation panel will rate the achievements of the new programme. Much will depend on how the Commission's officials adapt their choices to the Farge's panel's pleas. The test will be whether Europe's middle-sized businesses are markedly more efficient. □

SELF-EVALUATION

Rooting for grants

SELF-EVALUATION is the price the Commission has to pay for its existence. Councils of ministers insist upon it. But one official describes the process as the administrative equivalent of repeatedly digging up a newly planted tree to see whether its roots are growing.

The Farge panel, for example, was in a position to attempt to estimate the economic benefits that would flow from the two first phases of the BRITE programme by means of a questionnaire to the industrial companies participating.

Among other things, participants were asked to estimate the degree to which the project on which they were working would increase their annual turnover, from which the Farge panel estimated that the total increase of annual production resulting from BRITE projects would exceed 2,000 million ECU. But the panel also noted that the same companies planned to commit only "modest" sums to the further development of the outcomes of their projects, for which reason it suggests that the economic benefits expected of the projects should "be viewed with some caution". □

SCIENCE IN EUROPE

TELECOMMUNICATIONS 2000

Linking an optical cable to every house

Brussels

Who knew that Europe is building the hardware and software for a broad-band communications network that will begin to be a reality six years or less from now? The goal is to develop, by 1995, the technical ingredients required for a digital communications network capable of distributing through optical cables both high-definition video signals and huge quantities of data. Brussels seems confident that the project will succeed.

In many ways, the RACE project is what Pierre Aigrain, the French government's chief adviser on science and technology in the late 1960s, was then pleading for (to the EEC). But the new project's ambitions go far beyond Aigrain's hopes. One of the objectives, for example, is that all European dwellings, not simply business offices, should eventually be connected to the network. Meanwhile, there will be high-definition television for all, and pan-European mobile cellular telephony.

According to Roland Hüber, the director in charge of what is called Directorate F (a branch of DGXIII, the Commission's telecommunications ministry), RACE has now let 85 contracts to groups of companies and other organizations (on the Commission's usual 50:50 basis). More than 230 companies are involved, including all the major manufacturers of telecommunications equipment in Europe (together with AT&T and IBM). There are also 89 universities and other independent research organizations, as well as 11 PTTs. Collaborators from the European Free Trade Area are welcome.

As a means of organizing a major technical project, RACE is itself an innovation (which has been replicated in many of the Commission's projects). The pattern is determined by the circumstance that the Commission is merely the stimulator of innovation, not its eventual executor. Even so, the first step seems to have been to define objectives and to carry out a critical-path analysis for their attainment. But the objectives are not merely technical — the programme supposes RACE must also demonstrate useful applications of broadband networks, which means stimulating demand, and must then study some of the almost sociological problems that are bound to arise so as to demonstrate to eventual investors in the network that their money will be returned.

A further difficulty is that the Commission's funds cannot possibly be stretched to cover all the developments that will be needed for such a project, whence the decision that the Commission should advertise all the tasks that will have to be carried out, but to let contracts for the critical nodes and for a proportion of the others, leaving it to the competitive instincts of the disappointed applicants to pursue projects with their own resources.

The earlier phases of RACE (which began formally at the beginning of 1988) are largely technical, ranging from software development to the investigation of indium phosphide as an alternative to barium niobate in optical switching. Now, while the first crop of projects is under way, the Commission is looking for demonstrations of applications.

Even these phases of the programme offer everybody something. One of the pilot application projects approved this year, for example, involves 15 European museums (the majority in West Germany) which have undertaken to develop means of displaying museum objects on work-station screens, together with associated sounds and images, so as to make museum collections generally available. The project requires the development of techniques for managing archives by means of expert systems. RACE is interested because similar techniques could be applicable in business. There are also two publishing projects — one involving the rapid transmission and processing of information that may be provided in different forms, the other more specifically concerned with the transmission and local production of newspapers.

A large part of the explanation for the change of climate is that the Commission can now boast of having won the collaboration of Europe's traditionally quarrelsome PTTs. One theme running through the report of a strategic audit of the project carried out by a team in which PTT managers were prominent is that national governments must quickly make up their minds about the regulatory framework within which the communications network will operate.

RACE is one of the EEC's more obscure acronyms (standing for R&D in Advanced Communications for Europe), but the word epitomizes the sense of urgency in its conception. The project owes its existence to the recognition in 1985 that the development of broad-band communications systems in Japan and the United States was ahead of that in Europe, and to a calculation that European companies and PTTs, left to their own devices, would not be able to bridge the gap.

By 1986, the Commission was asking for 800 million ECU to support its work-plan, but the request was trimmed to 550 million ECU in the framework budget eventually agreed. Now the Commission is asking that some of the funds should be restored, as it has emerged that many of the projects it has backed will need five, not three, years to complete.

The management of the programme sets great store by the biannual meetings at which all the project teams are represented. Otherwise, projects are autonomous and, as with other industrial research supported by the Commission, members of the project teams make their own arrangements for sharing patent rights and, in due course, such profits as may flow from their development. But the Commission has the right to require that patent rights should be licensed on reasonable terms to other European companies. Beginning in 1992, it is intended that there should be demonstrations of the kinds of integrated networks that may be built from the components that will by then have been developed, at

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APPLIED BIOLOGY

Travelling a slow road to new technology

Brussels

The Commission's research strategy gives applied biology a central place, but progress has been slower than people in Brussels were hoping as long ago as 1980, when the Commission began modestly to support biotechnology projects. Not that enthusiasm has dimmed, but regulatory hesitations by some member states are one cause of delay. Another is that the European blend of well-established pharmaceutical and chemical companies and small start-up companies does not easily lend itself to the kind of financing with which the Commission is most familiar.

The Commission nevertheless maintains a kind of cheerleading organization called the Concertation Unit for Biotechnology in Europe (or CUBE) which is a fertile source of ideas and, occasionally, of smallish programmes backed by Commission funds. One of its tasks is to steer Europe towards applications of biology that will not further increase present embarrassing overproduction of many kinds of foodstuffs, whence the strategy of encouraging the development of new kinds of crops having a greater nutritional value or containing important industrial raw materials. Using biotechnology in pest control is another goal, as is the development of techniques for using the whole of a crop plant — not just, as in the case of cereals, the seeds.

The name for the new programme, launched last year, is ECLAIR. The budget is a comparatively modest 72 million ECU over five years. But the programme sidesteps contentious questions about the release into the field of genetically engineered organisms. ☐

first on a laboratory scale, afterwards more generally.

In the end, the success of RACE will hang on the extent to which it influences the development of a broad-band communications network in Europe — and when. Much will depend on the speed and the vigour with which national governments are prepared not merely to enforce common technical standards but to create market conditions in which broad-band communications can prosper.

There are thus political as well as technical problems to solve, not the least of which is that of requiring European PTTs (most of which remain nationalized industries) to allow outside commercial organizations to lease communications channels in the broad-band network for the provision of what are called value-added services — video signal transmission, for example.

The obvious danger is that different governments may choose to deregulate their PTTs in different ways, thus replacing the present system in which monopolies do what they wish within their territories to one in which national patterns are as different from each other as at present. The Commission spelled out the dangers in a paper published last year, but it has no power to turn its wishes into reality. RACE itself seems convinced that the pace of technical change will shorten its own timetable, but that may be an over-cheerful view. Political difficulties that remain unsurmounted could work the other way. ☐

RESEARCH FOR INDUSTRY

Cause and effect in a competitive world

Brussels

THE European Commission is outspoken about its policy on industrial research, and on research in general. Starting from the calculation that the twelve EEC members spend less on research and development than the United States, both in absolute terms and relative to gross domestic product (GDP), and less than Japan by the second yardstick, the Commission concludes that the objective of its research policy must be to make Europe "competitive", pursuing "where appropriate, its own technological options".

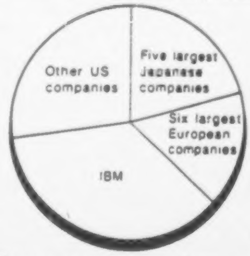
The figures, conveniently collected in the *First Report on the State of Science and Technology in Europe* presented to the European Parliament at the beginning of this year, are chastening.

In 1985, EEC spending amounted to 76,250 million ECU, compared with 134,645 million ECU in the United States and 48,056 million in Japan. As a proportion of GDP, European spending was 1.9 per cent, compared with 2.8 per cent in the United States and 2.6 per cent in Japan. The same report notes that non-defence research and development expenditure in Japan is growing twice as quickly (9 per cent a year against 4 per cent a year) as in Europe and the United States.

The Commission is also disturbed by what seems to be a manpower imbalance. According to the US National Science Foundation, in 1986 there were 69 US workers in research and development for every 10,000 in the total labour force, compared with 63.2 per 10,000 in Japan (in 1985) and corresponding figures (in 1984) of 49.1 in West Germany, 41.2 in France and 32.8 in Britain. The report again notes that only the Japanese figure is growing quickly.

The figures for the output end of the equation are equally sobering. The bulky annexes to the report record in detail that, in industrial sectors as different as chemical production and machine-tool manufacture, EEC performance is in relative decline.

The figure below shows the EEC's estimate of the world's data-processing market in 1987 secured by the 20 largest companies. The report notes that sales outside Europe of even the largest of the European companies are a small proportion (15 to 20 per cent of their turnover).



Shares in the market (courtesy of Datamation).

The Commission's argument from this point on is simple. There is an imbalance between the EEC and Europe's principal competitors both in efforts in research and development, and in industrial performance. So is it not reasonable to link the two as cause and effect?

The conclusion is that the three goals for EEC research are to improve Europe's international competitiveness, to "increase its capacity to pursue its own scientific and technological options, where necessary by reducing its dependence on others" and "to respond to the needs of society by improving the quality of life".

The Commission concludes that there are five areas in which European efforts should be concentrated, as follows: information technology and telecommunications, industrial materials, aeronautics "where Europe faces a particularly important competitive challenge", the biological sciences (including biotechnology) and energy.

It is clear that aeronautics will feature prominently in the Commission's next Framework programme. The argument is largely economic, but the competition is exclusively from the United States. The volume of civil air transport is growing at 7 per cent a year, and roughly 40 per cent of operating costs are determined by the cost of the aircraft, while there is also a military market in which, the Commission said in a document published in June last year, US restrictions on the sale of advanced aircraft are worrying.

The plan is that a pilot programme of coordinated research will be drawn up later this year with the intention that there should be a full-blown research programme looking for funds in 1990. For as things are, the Commission said last year, "European industry remains largely divided between national interests. . . . Continuation along this path can only lead to failure".

This important document also deals with the balance between basic and applied research, noting at one point that many European governments in recent years have effected a redistribution of resources from basic to applied research and adding "there is a risk that the pendulum will swing too far . . . just [when] our competitors are placing a greater emphasis on basic research". This is said to be a reference to the growth of the US basic research budget during the Reagan administration and to recent calls in Japan for more attention to the same cause.

On the related issue of the discrepancies within the EEC between the performances of different governments, the report notes that spending on research and development in West Germany, France and Britain (in that order) accounts for 75 per cent of all EEC spending, and that the proportion of GDP spent on research and development ranges from a maximum of 2.8 per cent in West Germany to 1.5 per cent in Italy, 0.8 per cent in Ireland and less than half of that proportion in Greece.

The discrepancy is described even more vividly in an annexe to the report prepared by the Irish National Board for Science and Technology, which calculates that the GDP per head of the four poorest countries in the EEC (Ireland, Spain, Portugal and Greece) have an average GDP per head less than 70 per cent of the Community average, but spend (per head) only 25 per cent as much on research and development. ☐

JOINT RESEARCH CENTRE

A new vision of unity in standards and training

London

Jean-Pierre Contzen, the Belgian director-general of the Commission's Joint Research Centre (JRC), has a vision in which the nine research institutes under his wing will become an amalgam of a standard-setting organization and a means of training Europeans in new technology. Arguing that Europe has too few public research laboratories, his belief that the JRC has a future is infectious. But the future has not always been as certain.

In reality, JRC has only in the past five months emerged from the most serious threat to its existence — the plain discontent of several member states most openly expressed during the long haggle over the present Framework programme. The complaints were that the four laboratories (then distinct) were too costly, too large, badly managed and without function.

The outcome was a review process carried out by a panel under Dr Harry Becker, research director of the Royal Dutch Shell Oil Company, which began in July 1986, and whose chief recommendations were structural and managerial in character. Crucial among these was the decision that the research programme and the administration of JRC should be overseen by an independent board, whose first chairman is Sir John Kendrew, the British Nobel prizewinner.

Contzen, previously DGXII's planner (and thus the architect of the present Framework programme), is in the unusual position of having helped to review the organization he must now administer. Plainly there is some frustration that the legal procedures were completed only in November 1988 (the new plans had to be approved not merely by the Commission and the council, but by the parliament as well). But now, with relief, he says that the new organization is in place.

The most obvious change is verbal: the Commission used to operate four Joint Research Centres, at Karlsruhe (West Germany), Geel (Belgium), Patten (the Netherlands) and Ispra (in the foothills of the Italian Alps), but now there is just the Joint Research Centre, in the singular. The three northern laboratories have been renamed as institutes (but Petten, now called the Institute for Advanced Materials, has a kind of outstation at Ispra): as yet, their research programmes are little changed.

Ispra, always the worry, has seen the most upheaval. Its research programme has been divided into five parts, each of which is renamed as a separate institute. Ispra also becomes the location of the unit intended to provide the rest of the organization with research support, principally in computing.

Part of Contzen's immediate problem is psychological: how to give the 2,180 members of his staff the ideal blend of institutional loyalty and corporate 'solidarity'? The calculation is that the identification of separate institutes dealing with different parts of the research programme is a necessary means of making the separate functions pointed and of making sure that people know what they are about. But there is also a long-term need that people should move more freely than in the past from one programme to another.

Inflexibility is the most obvious difficulty. The Community's procedures are an encumbrance: line-by-line approval and scrutiny of the budget is routine, which means that there is little scope for transferring resources from one project to another as new opportunities arise.

The immobility of the staff is another impediment. Only about 3 per cent move to posts outside JRC each year. What Contzen hopes is that the future pattern of employment may change that. New appointments are now routinely made on a five-year contract, which may be renewed for a second five-year period, but not thereafter; either the person concerned is then appointed for an indefinite period, or he or she must leave.

More than half (53 per cent) are already employed on short-term contracts such as these. It is now also planned that there should be a system of three-year appointments that will be strictly non-renewable. The first ten posts have been advertised, but Contzen hopes there will be 150 of them in four years. He regards them not merely as a means of recruiting specialists for urgent tasks, but also as a kind of industrial postdoctoral fellowship that may be an innovation in its own right.

JRC also plans to foster its more familiar fellowship schemes (there were 11 graduate students and 24 postdoctoral fellows on the books last year) and to attract more senior people from elsewhere for periods of up to a year. (There were 58 of these sabbatical fellows in 1988.)

Contzen has undertaken that in the next four years, the annual turnover of staff at JRC will increase from 3 per cent to between 5 and 10 per cent a year. A plan to terminate the appointments of 100 staff members will help, but is bound to be a bone of contention in the council of ministers, which has been severely critical of the generosity of previous early retirement schemes.

Salaries at JRC (and at other Commission establishments, such as JET) have always been a contentious issue, partly because they must of necessity be greater than those paid in the EEC's most prosperous member states, partly because they are tax-free. The other side of that coin is that the language and cultural barriers within Europe are still so great that the education of JRC employees' children is likely to be interrupted, as will be their spouses' careers.

The quota system is another stifling influence on JRC. Broadly speaking, the nationality of the professionals on JRC's staff must reflect the size of member states. It is not so much that governments have been anxious to secure for their own nationals posts in a well-paying organization (although there is some of that); others are or have been alarmed that JRC might suck away important parts of their skilled labour force.

The Commission (which is ambivalent on the issue) offers in defence of the system the reflection that it helps to diffuse JRC's work through the Community. But quotas are an irksome impediment to good management; Contzen wishes they would go away. The question of whether there would be quotas (and on what basis) in a united Europe seems not to have been considered.

Despite the impediments, the pattern of research is likely to change more quickly now than in the past. One administrative innovation is the decision that roughly 5 per cent of JRC's resources should be spent on the exploration of new projects.

Under this rubric, in 1988 JRC embarked on investigations of the use of ultrasound (21 kHz) for removing aero-

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Commitology

Brussels is as prolific in the invention of committees as in that of acronyms, and even uses the word commitology to describe the theory and practice of committee creation — do committee members represent member states? Who nominates them? Which arm of the EEC reimburses members for travelling expenses? Are decisions by consensus? If a decision is reached by a simple majority, can the chairman break a tie?

This year, each of the nine institutes of the Joint Research Centre (this page) will be blessed with an advisory committee. Most of the Commission's research programmes have one of their own as well.

But in the Commission's administration of science and technology, the most powerful committees are CODEST (page 734), widely respected for its independence; CREST (representing national governments and advising on general strategy), commonly said to be too big to be workable, let alone manageable; and IRDAC (which stands for "Industrial Research and Development Committee"), which suffers from the same faults. ☐

THE nine new institutes of JRC created by last year's reorganization are as follows:

- **Institute for Transuranium Elements**, at Karlsruhe (West Germany), may be best known for basic studies of the physical and chemical properties of the actinides, but is also the originator of the project to use ultrasound for removing aerosols.
- **Central Bureau for Nuclear Measurements**, at Geel (Belgium), has a reputation for precise measurements, most recently of the low energy fission cross-section of ^{235}U, but is also making precise measurements of the silicon lattice as part of the international redefinition of Avogadro's number.
- **Institute for Advanced Materials**, at Petten (the Netherlands), is making a transition from the exclusive study of materials under neutron irradiation (for which it was originally established) to the development of new materials and the modification of their properties by surface and other engineering.
- **Institute for Systems Engineering**, at Ispra (Italy), develops new safeguards techniques for nuclear inspectors, gathers data relating to the safety of thermonuclear fusion reactors but is well-known for a computer program for the assessment of solar input to groups of buildings as part of a general interest in solar heating and conversion.
- **Institute of Safety Technology**, at Ispra (Italy), is building the reaction wall for the assessment of built structure under mechanical impulsion, but is still concerned with aspects of reactor safety including the study of cooling systems in experimental rigs. It has organized a study of the problems of handling tritium in bulk as will be required in thermonuclear fusion reactors.
- **Environment Institute**, at Ispra (Italy), traditionally concerned with air and water pollution, has now commissioned a laboratory for the analysis of foodstuffs and drugs.
- **Institute for Remote Sensing Applications**, at Ispra (Italy), mostly working on the design of novel instruments, has recently proposed to the European Space Agency a scheme for radar sensing of the Earth's surface and plans to use Lidar for the monitoring of fluorine compounds in the atmosphere.
- **Institute for Prospective Technological Studies**, at Ispra (Italy), is in the process of being organized as a means of contributing to the analysis and formulation of DGXII's policy.
- **Centre for Information Technologies and Electronics**, at Ispra (Italy), is one name for JRC's computer centre, but also has responsibility for the development of software and will arrange for the design and production of specialized chips. □

sols from large masses of air (which may be useful in dealing with chemical accidents), the applications of neural networks in computing and the further development of a non-destructive monitoring instrument for assessing plutonium in radioactive wastes. High-temperature superconductivity also featured in the programme last year as, no doubt, cold fusion will in 1989.

Broader considerations point to more radical changes in the years ahead. There is, for example, an obvious difficulty at Petten, the chief site of the Institute of Advanced Materials, which also houses JRC's High Flux Reactor originally built as a materials testing tool for Euratom. The reactor is now used for the routine testing of fuel rods of different design as well as for constructional materials used in reactors, but its future is evidently linked to the uncertain future of nuclear power. Accordingly, the operating power and the duty cycle of the reactor have been degraded, if only to prolong its life.

Another strategic consideration is that JRC will be safer if it can work more directly on projects relevant to the Commission's own needs. Data-collection and dissemination (on subjects as different as world shipbuilding and the properties of potentially hazardous chemicals) is an obvious opportunity. So is work on environmental problems, where Ispra's Institute of the Environment obviously has an advantage.

There is a programme to use satellite observation data (from the French SPOT instruments) to compile agricultural statistics, using five chosen plots of ground in different parts of Europe. Ispra is similarly working on the improvement of instruments for the non-destructive measurement of fissile materials as used by the inspectors who operate nuclear safeguards procedures. (The European Community has secured an undertaking from the International Atomic Energy Agency that its member states' compliance with the Nuclear Non-Proliferation Treaty will be assured by the reports of its own inspectors.)

In the same spirit, the research group at Ispra originally concerned with the safety of nuclear reactors, and now renamed the Institute for Safety Technology, has spread its wings also to cover the safety of civil engineering structures and of industrial plants. The group should have finished next month the design of a structure (called a reaction wall) for the measurement of seismic and other mechanical impulses to structures. It has also become a source of expertise in the application of finite-element techniques in the design of engineering structures.

But much else of JRC's work is of a general character, relevant to the Commission's needs only in the most general sense. Conversely, there are fields in which the Commission would not at present turn to JRC for advice on the solution of all its problems — the use of hormones in growing beef cattle, for example, despite Ispra's interest in NMR techniques in the analysis of foodstuffs (the alcoholic content of wine in particular: see the News and Views article on page 708 of this issue) or the development of technical standards in telecommunications (where other organizations are more expert).

Yet the new research commissioner, Filippo Maria Pandolfi, has been saying since he took office at the beginning of this year that he wants DGXII to concentrate more of its resources on 'pre-normative research', which is eurospeak for work that may help to strengthen the Commission's administrative hand, from the standardization of equipment (as in telecommunications) to the basis for environmental standards and even the promulgation of standards used in trade and commerce, the work of old-fashioned standards laboratories for example.

In a broad sense, that is also a central objective for Contzen — but nobody wants JRC to become a kind of International Bureau of Standards for Europe.

Budget pressures will also shape the future pattern of JRC. The Commission has decreed and the board has agreed that JRC should find a greater proportion of its income from outside the Commission's budget, and indeed the annual report for 1988 (issued earlier this month) says that contracts already signed will contribute about 30 per cent to JRC's costs during the four years ending in 1991. But that calculation is something of a fudge.

The external contributions (over four years) include 55 million ECU for the operation of the Petten reactor and 59 million ECU for the support of Commission activity in agriculture, the environment and the like. Genuine external contracts now signed will bring in only just under 20 million ECU by 1991, although JRC's reorganization (and the recognition that its future depends on selling its services) will no doubt increase that amount substantially. But operating costs are less than half the total: 'personnel credits' amount to 132 million ECU out of this year's total budget of 239.4 million ECU.

Indeed, Contzen is also quick to argue that these calculations do not give JRC credit for the work it does as a partner in several of the consortia contracted to work for the Commission's industrial development programme. (The rules prevent programmes such as RACE from paying money to JRC.) Institutes collaborate out of interest, but there is a possibility that royalty income will eventually accrue. □

BASIC RESEARCH

Larger budget still too small for comfort

Brussels

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One of these is the research programme on new permanent magnets typified by the NdFeB alloys which was begun by the Stimulation Programme in 1985 and which now embraces 120 people from 58 different laboratories (most of them, interestingly, at universities). The collaboration is following up the discovery in 1963, by the Sumitomoto Special Metals Company and General Motors, that sintered materials with the approximate composition Nd Fe B, make permanent magnets of high field strength and coercivity.

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FORWARD LOOK

Where to go next?

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Unprepared for the single market

Will it be different after 1992? The general expectation that everything in Europe will change when the EEC (at last) becomes a common market is belied by the inadequacy of the preparation for that event.

THE EEC's research programme, the subject of the last part of this survey of European science, has always been controversial and will long remain so. The Treaty of Rome omitted to give the European Commission the power to sponsor research, because in the simple customs union then foreseen, the Commission needed merely the power to create the level playing-field on which companies in member states could compete on equal terms. In the 1950s, before research became a self-conscious component of public policy and long before governments recognized the link between research and prosperity, research belonged with cultural policy squarely within the competence of member states. Both the Iron and Steel Community and Euratom (which predated EEC) had research remits, but they had technical needs to satisfy.

Since then, the Commission has stumbled into research by historical accident — the coincidence of its administrative takeover of the two subsidiary communities with the rise of European anxieties in the 1970s about the 'technology gap' between Europe and the rest of the industrialized world. The Commission has responded manfully, but not always wisely, to this challenge. Its programmes described in the preceding pages are merely the most conspicuous. Yet now, with the prospect of a single market going beyond a mere customs union, there can be no doubt that the Commission has a proper role in research. The Single Act that promises great things for 1992 acknowledges as much. The danger now is that what it does will be the extrapolation into the future of present historical accidents. Several questions arise.

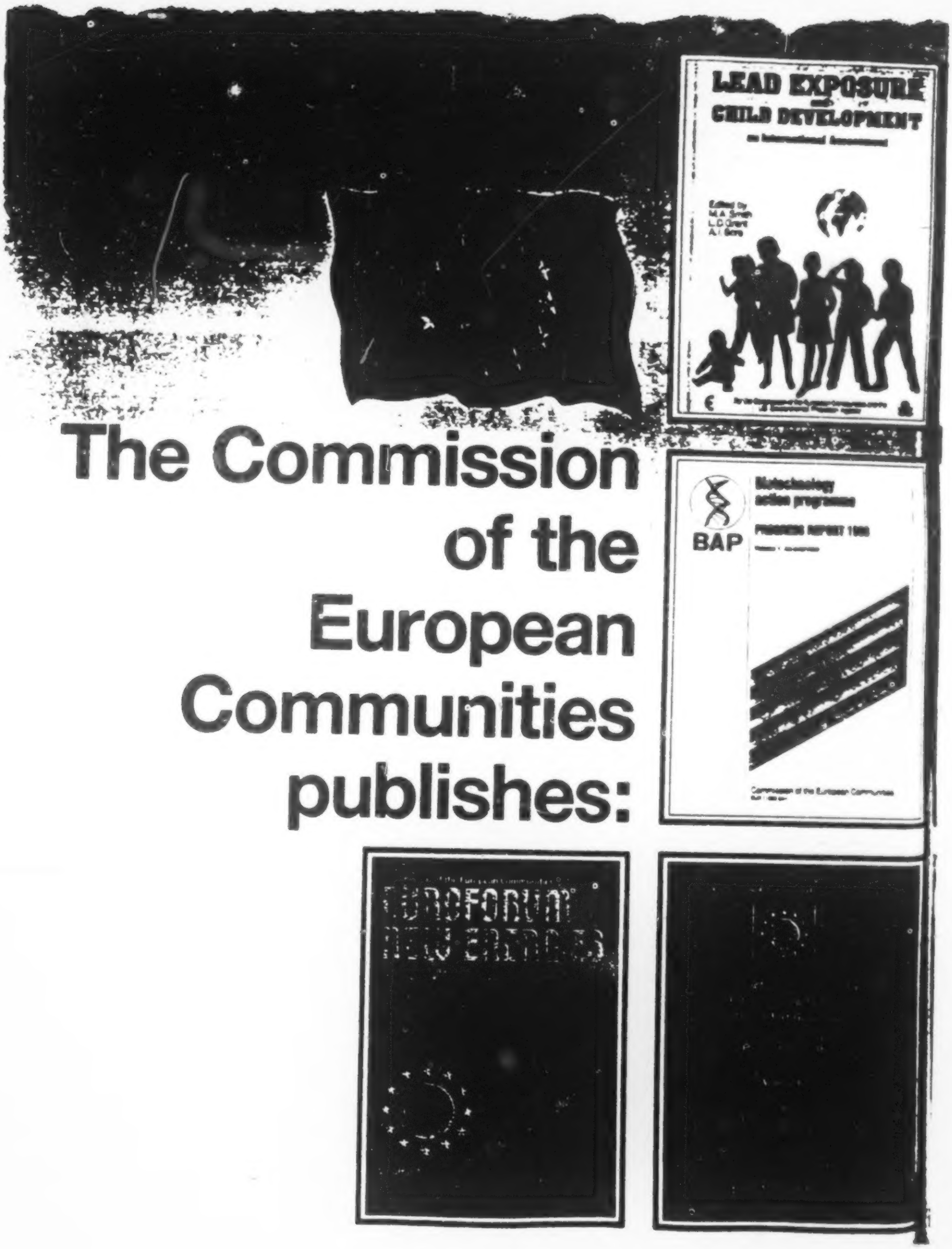
First, there is the matter of administration. In part, the Commission has been unfairly pilloried. The Joint Research Centre (once named in the plural) was in a bad way when the Commission took it over. Now, at least, there is a workable structure and a plan that may succeed (page 732). It should be given a fair chance. The more expensive cost-sharing programmes (page 729) are a more mixed bag. Much of the work they support is valuable — the evaluation panels say so — but they would be more valuable if they were not so often hastily thrown together. Often the Commission will spend well over a year winning approval for some scheme, give client companies and academics a few months in which to apply — and then spend more than a year making legal arrangements for the funds to be released.

Second, there is the matter of what the Commission's research is for. As stated, the purpose is to enhance industrial "competitiveness" while supporting only "precompetitive" industrial research. The Farge panel last year spotted that contradiction. Another, certain to seem sharper after 1992, is whether it will make sense to insist that industrial research projects qualifying for assistance should always entail transnational collaboration when European competitiveness (with the outside world) could be based on a single efficient company. A further difficulty is that these projects seem to concentrate on innovation (often the 'me-too' kind) rather than efficiency, suggesting that self-sufficiency is the real goal.

Third, there is the matter of the balance between basic and applied research. The Commission has so far concentrated on the second, but acknowledges that Europe's future hangs not only on a torrent of innovation but on a sufficient supply of innovative people. The logic of that is that it should be spending a greater proportion of its funds on basic research, which is the only proven way of systematically turning talented people into innovators. The SCIENCE programme (page 734) is fine, but should be increased and also supplemented by a means of backing long-term institutional endeavours. The planned, but frustrated, VLBI scheme (page 719) is a test-case.

Fourth, there is the matter of the Commission's own dependence on science. Even among its constituents, the Commission has a bad name for making technical decisions in apparent ignorance of the ins and outs of technical questions. The decision last year to ban the use of anabolic steroids in growing beef followed the over-stringent standards for radioactive materials in food adopted in the aftermath of Chernobyl two years ago. But the Commission corporately is not nearly as ignorant as it makes itself seem. It is merely that when technicalities contradict what seem to be political, social or economic imperatives, it is easier to make a decision by neglecting to ask for the inconvenient advice. That may keep member-governments happy, but it is not a way to govern.

Finally, there is the related matter of the Commission's own personnel, researchers on its payroll, for example. As things are, the Commission is compelled by its member governments to operate a quota system: governments do not want to stuff ECUs into other nationals' pockets, especially in such large amounts. Will petty chauvinism of that kind make sense after 1992? And if not, how else are talented people to be employed? The question is again administrative, but it also goes deeper: the Commission expects 1992 to be a milestone on the way to a United States of Europe. If it had its time again, the Commission would no doubt start from somewhere other than the Treaty of Rome, perhaps from a common understanding on external relations. But history does not repeat itself for the benefit of those whom it inconveniences. The Commission's flair for dealing with its officials as if they were European could be another acid test of the validity of its ambitions for Europe. □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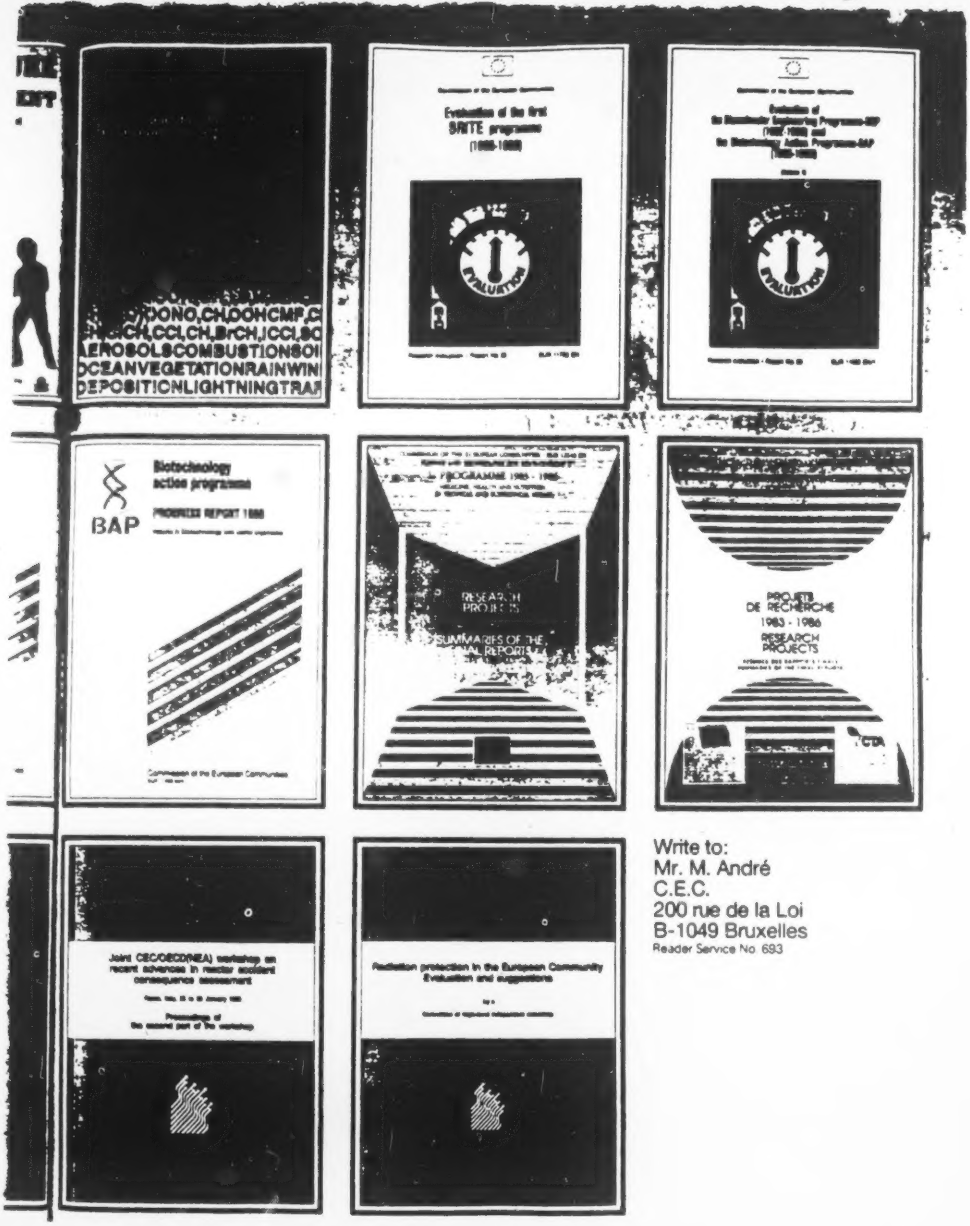
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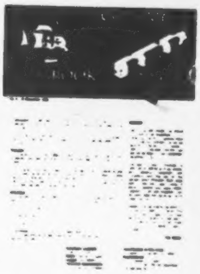

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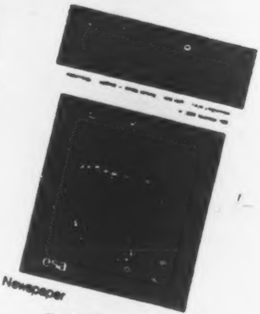

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European Officials Reach Consensus on 2 Education Issues Related to Plans for 1992 Barrier-Free Economic Market

27.1.24 **By JANE MONAHAN** 89

SEGOVIA, SPAIN

Education ministers and vice-ministers from the European Community's 12 member nations have reached a consensus on two education issues related to the E.C.'s plans for a barrier-free economic market in 1992.

At an informal two-day meeting here this month, the ministers agreed on these points:

- Technical and vocational education in all 12 countries should be divided into two cycles—one covering the last two years of high school and the other providing specialized training for two to three years beyond high school.
- Governments should provide public education for all students through the age of 16. In Spain and Portugal, the age is now 14.

Those elements are considered important first steps as the ministers work toward a broad agreement aimed at facilitating the exchange of students across national boundaries in 1992 and beyond.

One key issue that escaped consensus here, however, concerned the proposed use of common requirements for university admission in the 12 nations.

In that regard, Education Minister Javier Solana of Spain noted that common admission would force some countries, including Spain, to raise their standards.

As an example, Mr. Solana, who presided at the Segovia meeting, pointed to Belgium's system of open admissions. Some limitations would have to be imposed on admissions there in 1992, he said, or Belgian universities would soon be inundated with students.

The ministers also failed to agree on how to finance mobility.

According to "Education and the Process of European Integration," a document that the Spanish government prepared for the meeting, the 12 members of the European Community have already agreed that each country will recognize each other's high-school diplomas. Now, said the document, it is time to move on to arrangements for admission to all levels of education, the length of academic programs, and core studies to be included in all curricula.

Those issues will be considered at two more meetings of the education ministers this spring.

Here in Segovia, the officials concurred that in order to promote the mobility of students and faculty members across Europe, no government should obstruct efforts to find common standards.

Officials in some E.C. countries evidently are afraid that common academic standards may contribute to an erosion of cultural and historical differences in their societies, and—at least in the view of some British officials—to a loss of educational quality, as well.

Nevertheless, the education ministers called for broad support of existing West European programs to encourage student exchanges, and they recommended that the E.C. expand its education-information network and provide easy access for all users.

Earlier, at a separate two-day conference in Madrid, delegates to the 22-nation Council of Europe called for university cooperation in Europe to extend beyond the E.C.'s 12 member nations—Belgium, Britain, Denmark, France, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Spain, and West Germany.

The delegates argued for "open frontiers" to increase cooperation among universities in Eastern and Western Europe.

The Council of Europe's members include all E.C. countries plus Austria, Cyprus, Finland, Liechtenstein, Malta, Norway, Sweden, Switzerland, Turkey, and Yugoslavia.

Both the European Community and the Council of Europe have set goals for foreign-student enrollments of at least 10 per cent of each country's students by the mid-1990's.

The European Community Studies Association

FORGING AHEAD: THE EUROPEAN COMMUNITY STUDIES ASSOCIATION

A REVIVAL OF INTEREST IN THE E.C. HAS LED TO MORE STUDY AND RESEARCH PROGRAMS.

DESMOND DINAN

If a catchy acronym is a key to success, then the European Community Studies Association (ECSA) is off to a good start. ECSA, as in *exce*llent, may not become a household word, but should soon be familiar to students, scholars, business people and lawyers who work on E.C. issues.

ECSA was founded in November 1987 by a group of Europeanists meeting in Washington, D.C. Its objective can be simply stated: to foster and promote study of the E.C. in North America. After an impresaive burst of activity in the late 1950s, 1960s and early 1970s, American scholarship on the E.C. languished. Now, after a lengthy hiatus, research and courses on the E.C. are once again on the rise in American universities, largely in response to recent initiatives within the Community itself—notably the decision to establish a single European market by the end of 1992.

ECSA seeks to reinvigorate and stimulate E.C. studies in a number of ways. First, by organizing seminars, workshops and conferences at which scholars and practitioners of E.C. affairs can discuss each other's work, explore areas of common interest and launch collaborative projects. Second, by promoting E.C. studies in university and college curricula and by encouraging graduate students to pursue research on the Community. Third, by developing trans-Atlantic contacts with European academics, associations and institutions engaged in E.C. studies. Finally, by publishing a newsletter to keep ECSA members informed of the latest developments in the rapidly developing field of E.C. studies.

Membership of ECSA is open to anyone with an interest in the Community. Dues are $20 a year, or $10 for students. At present, the Association has approximately 200 members. You can join by sending your name, institutional affiliation (if any) and address, together with a check payable to ECSA, to: Leon Hurwitz, Department of Political Science, Room 1744, Rhodes Tower, Cleveland State University, Euclid Avenue at East 24th Street, Cleveland, Ohio 44115.

The members of ECSA's interim executive committee, chosen at the November 1987 Washington meeting, are Glenda Rosenthal (Columbia University), Roy Ginsberg (Skidmore College), Leon Hurwitz (Cleveland State), Don Puchala (South Carolina), Pierre-Henri Laurent (Tufts) and myself (George Mason University). Glenda Rosenthal, Roy Ginsberg and Leon Hurwitz edit the newsletter, and have so far produced two outstanding issues.

One of the interim executive committee's first tasks was to write a constitution for the Association. The draft constitution, which appeared in the first issue of the newsletter, will be voted on at ECSA's first business meeting. The membership of the Association will also elect the first executive committee (as distinct from the *interim* executive committee) at that time.

The business meeting will be held during ECSA's inaugural conference at George Mason University in Fairfax, Va., on May 24-25, 1989. Calls for papers for the conference, on "The European Community in the 1990s: Emerging Concepts and Policies," were made last fall in advertisements in magazines and journals, and in a mass mailing to potential participants. In terms of volume, range and quality, the response was exceptional for an inaugural event. At a meeting in Washington on January 21, ECSA's Program Committee—Leon Lindberg (Wisconsin at Madison), Louis Orzack (Rutgers), Hugo Kaufmann (Queen's, New York) and I—considered more than 140 paper abstracts and panel proposals. Submissions came from as far afield as India, Africa and New Zealand, as well as from Canada, the United States and Europe.

The provisional conference program lists panels and discussions, not only on the causes and likely consequences of the unified market decision, but also on other political, economic, legal, sociological, scientific and technological developments within or related to the European Community. Conference participants will include some of the leading European and American authorities on the single market, the Common Agricultural Policy, European Political Cooperation and European company law, to name only a few of the areas and issues to be covered.

The conference is open to the public. Individuals from all academic disciplines, the public sector and the business community are encouraged to attend. For further information, write or call me at the Department of History, George Mason University, 4400 University Drive, Fairfax, Va. 22030; Tel.: (703) 323-2244.

Finally, I would like to say that ECSA's fledgling accomplishments, especially producing the newsletter and organizing the conference, would not have been possible without the generous financial and professional support of the E.C.'s Washington Delegation.

Desmond Dinan is Professor of History at George Mason University.

The European Community in the 1990s

Emerging Concepts and Policies

Provisional Program
Inaugural Conference
May 24-25, 1989
George Mason University

The Conference is made possible by a generous grant from the Delegation of the Commission of the European Communities, Washington D.C.
Other sponsors include George Mason University's College of Arts and Sciences, Graduate School, and School of Business Administration; and the German Marshall Fund of the United States

EUROPEAN COMMUNITY STUDIES ASSOCIATION

ECSA Inaugural Conference

MAY 24 (Day 1)

A	1A1 **Capital Markets** Rooms 5-6	1A2 **EC and World Trade** ST 131	1A3 **EPC 1** Ballroom C	1A4 **Company Law (1)** Ballroom A	1A5 **Opposition to EC** Rooms 3-4	1A6 **Jean Monnet** Room 1	1A7 **An all-European Integration?**
B	1B1 **Monetary Policy** Rooms 5-6	1B2 **EC and World Trade (2)** ST 131	1B3 **EPC (2)** Ballroom C	1B4 **Company Law (2)** Ballroom A	1B5 **Education and Labor Markets** Rooms 3-4	1B6 **Scandinavia and EC** Room 1	
C	1C1 **Europe Redefined** Rooms 5-6	1C2 **Commercial Policy** ST131	1C3 **CAP** Ballroom C	1C4 **Financial Linkages** Ballroom A	1C5 **Regional Policy** Rooms 3-4	1C6 **Second Enlargement** Room 1	
ECSA BUSINESS MEETING BALLROOM C							

MAY 25 (Day 2)

A	2A1 **Liberal Professions (1)** Ballroom A	2A2 **CAP and the World** ST131	2A3 **Europe in Space** Ballroom C	2A4 **Regional Specialization** Rooms 3-4	2A5 **Communications (1)** Rooms 5-6	2A6 **Turkey and EC** Room 1
B	2B1 **Liberal Professions (2)** Ballroom A	2B2 **Technology Cooperation** ST131	2B3 **EC and Developing World** Ballroom C	2B4 **Foreign Policy** Rooms 3-4	2B5 **Communications (2)** Rooms 5-6	2B6 **Social Democracy** Room 1
C	2C1 **Integration Theory** Rooms 5-6	2C2 **Security and Defense** Ballroom C	2C3 **Single European Market** ST131	2C4 **Eastern Europe** Ballroom A	2C5 **Tax Harmonization** Rooms 5-6	2C6 **Gulf States** Room 1
D	2D1	2D2 **Teaching EC Courses** Ballroom C	2D3 **Culture** ST131	2D4 **Legal and Constitutional Aspects** Rooms 3-4	2D5 **Industrial Restructuring** Rooms 5-6	2D6 **EC Institutions** Ballroom A

Provisional Program

(Please note changes in panel times and places from some previous Conference information)

		Wednesday May 24 (Day1)	**Thursday May 25 (Day 2)**
A	9:00-10:30 AM	Session A (7 panels)	Session A (6 panels)
B	10:45-12:15	Session B (6 panels)	Session B (6 panels)
	12:30-2:00 PM	Lunch	Lunch
C	2:15-3:45	Session C (6 panels)	Session C (6 panels)
D	4:00-5:30	ECSA Business Meeting	Session D (6 panels)
	7:30	Banquet	

George Mason University (GMU) is located in Fairfax, Virginia, in the Washington metropolitan area. Most conference panels and the two conference lunches will be held in the Student Union II Building (SUB II); other conference panels will be held in the adjacent Science and Technology Building (ST). The conference banquet will be held in the Holiday Inn, Fair Oaks.

Rooms are available at a special conference rate ($80 single/$85 double occupancy) in the Holiday Inn, Fair Oaks, located about four miles from the GMU campus. For reservations, call or write the Holiday Inn, Fair Oaks, 11787 Lee Jackson Highway, VA 22033; 703-352 2525. The cut-off for the special conference rate is April 23, 1989.

American Airlines offers super Meeting Fares Discounts to the conference, of 45% off the regular day coach airfare, with a seven day advance purchase ticket requirement. For reservations and information call toll free 1-800-433-1790. Ask for STAR FILE #S-96594.

There is a regular Fairfax CUE bus connection between the Vienna Metro station and GMU. In addition, during the conference special shuttle buses will run between the Holiday Inn and GMU at 8:15am and at 5:30pm. At other times during both days, special shuttle buses will connect the Holiday Inn, GMU and Vienna Metro station (south entrance) between 10:00am and 3:00pm at the following times:

Holiday Inn arrive/depart on the hour
GMU arrive/depart hour plus 20 minutes
Vienna Metro arrive/depart hour plus 40 minutes

For further program information write or call: Desmond Dinan, ECSA Program Chair, Department of History, George Mason University, 4400 University Drive, Farifax, VA, 22030; (703) 323-2244.

DAY I WEDNESDAY, MAY 24

SESSION A — 9:00-10:30 AM

1A1 SUB II Rooms 5- 6

Integration of European Capital Markets

Moderator: Michael Ferri, George Mason University

Marc Quintyn, National Bank of Belgium (Belgium): "Opening of EC Banking Markets: Concepts, Policies and Perspective"

F.W. El-Kharouf, Finance, Accountancy, Mohassaba, S.A. (Switzerland): "Banks' Strategic Options in the Single European Market"

Peter Coffee, University of Amsterdam (Netherlands): "Integration of EC Capital Markets, Banking and Financial Services: Implications for the EC and other Countries"

1A2 ST 131

1992: the EC and the World (Part I)

Moderator: Michael Smith, Coventry Polytechnic (UK)

Michael Smith, Coventry Polytechnic (UK): "Towards 1992: Internal Process and External Responses in the Development of the EC"

Rene Schwok, Graduate Institute of International Studies (Switzerland): "EFTA and 1992"

Lee Famsworth, Brigham Young University: "Japan's Response to 1992"

1A3 SUB II Ballroom C

Understanding European Political Cooperation (EPC)

Moderator: Martin Holland, University of Canterbury (New Zealand)

David Allen, Loughborough University (UK): "Competing Frameworks for Conceptualizing EPC"

Alfred Pypers, University of Amsterdam (Netherlands): "EPC and the Traditional Paradigm"

Simon Bulmer, University of Manchester Institute of Science and Technology (UK): "Development of EPC"

Stephen George, Sheffield University (UK): "Understanding EPC: a World System Approach"

1A4 SUB II Ballroom A

An Emerging European Company Law? (Part1)

Moderator: To be announced

Jim Maiwurm, Squire, Sanders and Dempsey: "Aspects of EC Company Law"

Mark Goldstein, US Department of Commerce: "EC Company Law Directives and 1992"

David Berger, Weil, Gotshal and Manges: "Development of Transnational Standards for a Target Company's Directors in a Takeover Context"

1A5 SUB II Rooms 3-4

Forms of Intra-European Opposition to the EC

Moderator: Carl Lankowski, SUNY Albany

Carl Lankowski, SUNY Albany: "The People's Movement Against the EC and the Structure of Collective Action in Denmark"

Ole Tonsgaard, Aarhus University (Denmark): "The Connundrum of Danish Attitudes Towards the EC"

Costis Hadjimichalis, University of Thessaloniki (Greece): "The EC and Regional Social Movements in Southern Europe"

Carsten Geier, Cornell University: "Are the Greens Serious About the EC?"

Thomas Hueglin, Wilfred Laurier University (Canada): The EC as a Case of Federal Failure"

1A6 SUB II Rooms3-4

Jean Monnet and the Origins of the EC

Moderator: Clifford Hackett, American Council for Jean Monnet Studies

Douglas Brinkley, Hofstra University
Sherrill Wells, US Department of State
John Gillingham, University of Missouri

1A7

Towards an All-European Integration?

Convenor: Reinhardt Rummel, Woodrow Wilson Center:

Reinhardt Rummel, Woodrow Wilson Center: "Dynamics of West European Integration: Prospects for an all-European Integration"

Friedmann Muller, Overseas Development Council: "Problems of Reform in the USSR and in Eastern Europe: the Search for All-European Solutions"

SESSION B —10:45 AM-12:15 PM

1B1 SUB II Rooms 5-6

Monetary Policy in the EC

Moderator: To be announced

Hugo Kaufmann, Queen's College New York: "The Road to a European Central Bank"

Stephen Overturf, Whittier College: "The Real Macroeconomic Impact of the European Monetary System"

Ralph Mehnert, The George Washington University: "The Private and the Commercial ECU: Europe's Contribution to World Finance"

1B2 ST 131

1992: the EC and the World (Part II)

Moderator: Alfred Tovias, Hebrew University (Israel)

Alfred Tovias, Hebrew University (Israel): "Technical Harmonization and Public Procurement"

George Yannopoulos, University of Reading (UK): "The External Economic Implications of the Completion of the EC's Internal Market"

John Yochelson, Center for Strategic and International Studies

1B3 SUB II Ballroom C

European Political Cooperation (EPC) Case Studies

Moderator: Martin Holland, University of Canterbury (New Zealand)

Martin Holland, University of Canterbury (New Zealand): "EPC and Southern Africa"

Elfriede Regelsberger, Institut für Europäische Politik (FRG): "EPC and Third Countries"

Papos Tsakaloyannis, European Institute for Public Administration: "EPC and the Superpowers"

1B4 SUB II Ballroom A

An Emerging European Company Law (Part II)

Moderator: To be announced

James Friedberg, West Virginia University: "The European Court's Wood Pulp Decision and the Transatlantic Convergence of Extraterritoriality Doctrine"

Sylvia Denys, Duquesne University: "An Update on EC Products Liability Law"

Kent Ford, George Mason University: "Protectionism European Style?"

1B5 SUB II Rooms 3-4

Higher Education, the Labor Market and Research Policy

Moderator: To be announced

Henry Wasser, CUNY: "Changing Relations Between Universities, Research Institutions and Industry: Catalyst or Deterrent to the Unity of Europe?"

Kassi Freeman, Emory University: "Impact of 1992 on Higher Education in the EC Member States"

1B6 SUB II Room 1

Scandinavia and the EC

Moderator: Donald Hancock, Vanderbilt University

Discussant: Robert Rinehart, Foreign Service Institute

Donald Hancock, Vanderbilt University: "The Apprehensive Outsider: Sweden and the EC"

Eric Einhorn, University of Massachusetts: "Denmark in Europe: A Perspective on Fifteen Years of Membership in the EC"

Geir Lundestad, Woodrow Wilson Center: "Norway's EC Relations"

WEDNESDAY, MAY 24

SESSION C— 2:15-3:45 PM

1C1

SUB II Rooms 5-6

Europe Redefined: From Messina to Milan and Beyond (Round-Table Discussion)

Convenor: Desmond Dinan, George Mason University

1C2

ST 131

Internal and External Economic Impacts of a Harmonized Commercial Policy

Moderator: Debra Miller, US Department of Commerce

Discussant: Michael Calingaert, National Planning Association

Seamus O'Cleireachain, SUNY Purchase and Columbia University: "Trade Policy and Europe 1992: Fortress or Sieve?"

1C3

SUB II Ballroom C

Whither the Common Agricultural Policy (CAP)?

Moderator: To be announced

Leila Sfeir, University of Illinois: "Problems and Prospects for EC Agricultural Policy Making"

Brigitte Young, University of Wisconsin at Madison: "1992 and CAP"

1C4

SUB II Ballroom A

International Financial Linkages and Securities Transactions (Round-Table Discussion)

Moderator: Michael Calabrese, Morgan, Lewis and Bochius

Robert Murphy, Morgan, Lewis and Bochius

David Strongin, Securities Industry Association

Kathryn Natale, Securities and Exchange Commission

Representative, T. Rowe Price

1C5

SUB II Rooms 3-4

Regional Development Policy in the EC

Moderator: Hugo Herwitz, Barry University

Joseph Thompson, Villanova University: "The EC and Northern Ireland"

Javier Elizalde: "The EC, Regional Development and Spain"

Robert Leonardi, European University Institute: "The Integrated Mediterranean Investment Programs: a Formula for Cohesion or Backwardness after 1992?"

1C6

SUB II Room 1

Implications of the Second Enlargement

Moderator: Gunnar Nielsson, University of Southern California

E. Moxon Browne, Queen's University Belfast (Northern Ireland): "Spain and the EC in the 1990s"

Michael Plummer, Resource Systems Institute: "Implications of the Second Enlargement for Partner and Non-Partner Countries"

Shirley Washington, Indiana University of Pennsylvania: "Portugal,Africa and EC"

DAY 2 THURSDAY, MAY 25

SESSION A — 9:00-10:30 AM

2A1 SUB II Ballroom A

Liberal Professions and 1992 (Part I)

Moderator: Birol Yesilada, University of Missouri at Columbia

Discussant: Werner Feld, University of Colorado at Colorado Springs

Louis Orzack, Rutgers University: "Education Policy and Professionals: the Single Market Proposals"

2A2 ST 131

The Common Agricultural Policy (CAP) and the World

Moderator: Dennis Avery, World Perspectives Inc.

Richard Kennaway, University of Canterbury (New Zealand): "External Impact of the CAP: a New Zealand Perspective"

Tassos Haniotis, Center for European Agricultural Studies (UK): "US-EC Agricultural Policies and GATT Negotiations"

Joseph Hajda, Kansas State University: "The EC and Agricultural Trade Conflicts: The Problem of Bilateral Confrontation With the US"

2A3 SUB II Ballroom C

Technology and the EC: Europe in Space (Round-Table Discussion)

Convenor: Colleen Driscoll Sullivan, Space Age Law and Policy Institute

2A4 SUB II Rooms 3-4

Regional Specialization and Spatial Disparities in the Single European Market

Moderator: To be announced

David Coombes, National Institute for Higher Education (Ireland): "The Politics of Scale: European Economic Integration, Spatial Disparity and Local Development"

2A5 SUB II Rooms 5-6

Communications in the 1990s (Part I): Communications in the EC

Opening Remarks: Morris Crawford, International Informatics

Moderator: Stephen Ruth, George Mason University

Morris Crawford, International Informatics: "Political Dimensions of EC Telecommunications in the 1990s"

Thomas Ramsey, Squire, Sanders and Dempsey: "Business Interests in a Single Market for Telecommunications"

Edward Regan, Manufacturers Hanover Trust: "Communications and Financial Services"

2A6 SUB II Room 1

Turkey and the EC

Moderator: Ayfer Bakkalcioglu, European Institute of Human Sciences, Communication and Technology

J. Redmond, University of Birmingham (UK): "The EC and Turkey"

Allen Shepherd, Chadron State College: "The EC and Turkey: a New Partner?"

THURSDAY, MAY 25

SESSION B—10:45-12:15 PM

2B1 SUB II Ballroom A

Liberal Professions and 1992 (PartII): a European Health Community

Moderator: Robert Aboudeely, Pfizer HPG

Michel Belanger, University of Bordeaux I (France): "The Legal Foundations of a European Health Community"

Leon Hurwitz, Cleveland State University: "The Migrant Physician and European Integration"

Maria Pia Belloni-Mignatti, University of Pavia (Italy): "The Free Circulation of Medical Professionals in the EC"

2B2 ST 131

EC Technological Cooperation

Moderator: Henry Nau, The George Washington University

Todd Watkins, Harvard University: "The Paridigmatic Evolution of EC Technological Cooperation"

Mary Anne Rose, NASA: "Airbus Industrie: High-Technology Industrial Cooperation in the EC"

Claire Shearman, Salford University (UK): "European Technological Cooperation"

2B3 SUB II Ballroom C

The EC and the Developing World

Moderator: Pierre-Henri Laurent, Tufts University

Pierre-Henri Laurent, Tufts University: "The Past: the Historical Origins of the Lome Relationship"

Pierre Defraigne, EC Commission: "The Present: Current EC Perspective on the North-South Relationship"

Ellen Frey Wouters, Brooklyn College: "The Future: Prospects for the EC-ACP Relationship"

2B4 SUB II Rooms 3-4

Foreign Policy of the EC Before and After 1992

Moderator: Roy Ginsberg, Skidmore College

Karsten Geier, Cornell University: "The EC as a Foreign Policy Actor Before 1992: a Case Study of the Pipeline Embargo"

Nancy Bullock, US Department of State: "The EC as a Foreign Policy Actor After 1992"

Lily Gardner Feldman, Tufts University and US Institute of Peace: "Rethinking the EC in Conceptual Terms: Model for Peace?"

2B5 SUB II Rooms 5-6

Communications in the 1990s (Part II): TV and Electronic Media Services

Moderator: Eileen Mahoney, CUNY

John Eger, Worldwide Media Group: "Broadcasting and TV Issues in EC 1992"

Winand Gellner, Trier University (FRG): "Regulating Program Procurement for TV in the EC"

Sharon Strover, Arizona State University, and Russ Barnes, Teledirect: and Harmeet Sawhney, University of Texas: "Three Case Studies of Media Regulation: Spain, France and the UK"

2B6 SUB II Room 1

The Social Dimension of the EC and the Viability of Social Democratic Parties

Moderator: To be announced

Christa Altenstetter, CUNY: "Europe Beyond 1992: Implications for National Health, Social Policies and Delivery Systems"

Beverly Springer, American Graduate School of International Management: "The Social Dimension of 1992"

Paulette Kurzer, Babson College: "Economic Convergence and Social Democratic Decline: the EC, Germany And Its Three Small Neighbors"

SESSION C — 2:15-3:45 PM

2C1 SUB II Rooms 5-6

Integration Theory: Then and Now (Round-Table Discussion)

Moderator: Glenda Rosenthal, Columbia University

Leon Lindberg, University of Wisconsin at Madison

Francoise de la Serre, Centre d'Etudes et de Recherches Internationales (France)

2C2 SUB II Ballroom C

The EC and West European Security

Moderator: Desmond Dinan, George Mason University

Reinhardt Rummel, Woodrow Wilson Center: "The US Reaction to EC Political and Security Integration"

John Foley, US Air Force and University of Illinois: "EC Security Cooperation: Implications for NATO"

Stephan Keukelaire, Catholic University of Leuven (Belgium): "The EC in the 1990s: Prospects for a West European Security Policy"

2C3 ST 131

Creating the Single Market: an Update (Round-Table Discussion)

Moderator: Jacques Pelkmans, European Institute for Public Administration (Netherlands)

Joseph Lee, University College Cork (Ireland)

Immanuel Wexler, University of Connecticut

Claus-Dieter Ehlermann, EC Commission

2C4 SUB II Ballroom A

The EC and Eastern Europe

Moderator: George Hoffman, The George Washington University

Discussant: Robert Cutler, Laval University (Canada)

George Hoffman, The George Washington University: "East-West Linkages in the 1990s"

Charles Jokay, University of Illinois: "EC-CMEA relations"

Bradley Stock, Principia College: "EC Strategies Towards Eastern Europe"

2C5 SUB II Rooms 5-6

Tax Harmonization and Monetary Integration in the EC

Moderator: To be announced

Alberto Majocchi, University of Pavia (Italy): "The Theory and Practice of EC Tax Harmonization"

Elke Thiel, Stiftung Wissenschaft und Politik (FRG): "Global Monetary Interdependence and Patterns of West European Monetary Integration"

2C6 SUB II Room 1

The EC and the Arab World

Moderator: Saleh Almani, School of Advanced International Studies

Subash Narula, University of Delhi (India): "The EC and the Gulf Cooperation Council Countries"

Saleh Almani, School of Advanced International Studies: "The Politics of the Gulf Cooperation Council: dialogue with the EC"

THURSDAY, MAY 25

SESSION D — 4:00-5:30 PM

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2D2 SUB II Ballroom C

Teaching Courses on the EC

Moderator: William Andrews, SUNY Brockport

Nina Ray, Boise State University: "Preparing Business Students for 1992"

Harvey Kebschull, North Carolina State University: "Simulations in EC teaching"

2D3 ST 131

Culture and European Integration

Moderator: Christian Lequesne, Centre d' Estudes et de Recherches Internationales (France)

Siegfreid Magiera, Hochschule fur Verwaltungwissenschaften Speyer (FRG): "The Emergence of a Europe of Citizens in a Community Without Frontiers"

Richard Brinkman, Portland State University: "The EC and the Evolution of Culture"

Ann Jonsson, Malmo (Sweden): "The Dilemma of EC Cultural Policy"

2D4 SUB II Rooms 5-6

Legal and Constitutional Aspects

Moderator: To be announced

Tom Eijsbouts, University of Amsterdam (Netherlands): "Constitutional Aspects of European Integration"

Thomas Irwin, University of Louisville: "Styles of Judicial Review in the EC and US"

2D5 SUB II Rooms 5-6

Intra-European Industrial Restructuring

Moderator: John O'Brien, Portland State University

Edward Aretz, Rijksuniversiteit Limberg Maastricht (Nehterlands): "The Delawarization of Europe"

H.W. de Jong, University of Amsterdam (Netherlands): "Industrial Restructuring in the EC"

Johan Bil, Lund (Sweden): "Europe in Economic Transition"

2D6 SUB II Ballroom A

EC Institutions and the Integration Process

Moderator: Leon Lindberg, University of Wisconsin at Madison

Mary Troy Johnston, Loyola University New Orleans: "The European Council: an Integrative or Disintegrative Innovation?"

Emil Kirchner, University of Essex (UK): "The EC Presidency, the SEA and Approaches to Integration"

Michael Burgess, Plymouth Polytechnic (UK): "Federalism and European Union: Past, Present and Future in the EC"

ADDITIONAL EVENTS

Wednesday, May 24

Lunch

12:30-2:00PM SUB II, George Mason University

Speaker

Eugene MacAllister, Assistant Secretary of State for Economic and Business Affairs
"1992: the US Perspective"
Introduced by Roy Ginsberg, ECSA

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4:00-5:30PM SUB II, Ballroom C
Business Meeting of the European Community Studies Association

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7:30PM Holiday Inn, Fair Oaks (cash bar 6:30-7:30)

Banquet

Keynote Address

Vasso Papandreou, E. C. Commissioner for Employment, Industrial Relations and Social Affairs, Human Resources, Education and Training
Introduced by Desmond Dinan, ECSA
Welcome by George Johnson, President, George Mason University

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Thursday, May 25

8:30AM-2:00PM Workshop on the Impact of 1992 on Mid-Atlantic Regional Exporters
(Co-Sponsored by the Virginia Department of World Trade, in association with ECSA)

Lunch

12:30-2:00PM SUB II, George Mason University

Speaker

Professor Werner Feld
University of Colorado at Colorado Springs
"The EC, Domestic Politics and Foreign Policy"

REGISTRATION FORM

Name ______________________________
Affiliation ______________________________
Address ______________________________
______________________________ Telephone ______________
Name(s) of Banquet Guest(s) ______________________________
Total Amount Enclosed ______________

Mail to:
Desmond Dinan
Department of History
George Mason University
4400 University Drive
Fairfax, VA 22030

Registration Fee:

Before May 1:
ECSA Member $50
Non-Member $70
ECSA Student Member $20
Student Non-Member $30

After May 1:
ECSA Member $75
Non-Member $100
ECSA Student Member $30
Student Non-Member $50

Fee includes lunches and banquet
Banquet guests $25

Make checks payable to ECSA

Remarks at the Boston University Commencement Ceremony in Boston, Massachusetts

May 21, 1989

Thank you, President Silber. And President and Madame Mitterrand, it's a great honor to have you here today. And to Governor Dukakis, my respects—the chief executive of this great State and my friend as well. To Mayor Flynn, His Eminence Cardinal Law, and Dr. Metcalf, Dr. Wiesel, and, yes, Kimberly, to you for that wonderful speech earlier on. And to Nancy Joaquim, who rendered both "The Marseillaise" and "The Star-Spangled Banner" in such fine way. It's a pleasure to be back in Boston, back in one of my home States—[*laughter*]—and I am delighted and honored to receive a doctor of laws from Boston University along with President Mitterrand. Doctor of laws—does this now make us a couple of Boston lawyers, my friend, Mr. Mitterrand? [*Laughter*] Who knows? I also would like to salute another most distinguished visitor: Prime Minister Mahathir of Malaysia, a friend to the United States, whose son is graduating today. We're honored to have him here. And I want to congratulate Barbara on a B.U. degree of her very own. [*Laughter*] And now that you're an alumna, take note: this kinder and gentler America that I'm speaking of does not always include the Terriers. [*Laughter*]

My sincerest congratulations go to every Boston University graduate and to all you proud parents cooking out along the 50-yard line there. [*Laughter*] And as Boston University graduates, you take with you a degree from a great institution, and something more: knowledge of the past and responsibility for the future. And take a look at our world today. Nations are undergoing changes so radical that the international system you know and will know in the future will be as different from today's as today's world is from the time of Woodrow Wilson. How will America prepare, then, for the challenges ahead?

It's with your future in mind that, after deliberation and a review, we are adapting our foreign policies to meet this challenge. I've outlined how we're going to try to promote reform in Eastern Europe and how we're going to work with our friends in Latin America. In Texas, I spoke to another group of graduates of our new approach to the Soviet Union, one of moving beyond containment, to seek to integrate the Soviets into the community of nations, to help them share the rewards of international cooperation.

But today I want to discuss the future of Europe, that mother of nations and ideas that is so much a part of America. And it is fitting that I share this forum with a very special friend of the United States. President Mitterrand, you have the warm affection and high regard of the American people. And I remember well about 8 years ago when you joined us in Yorktown in 1981 to celebrate the bicentennial of that first Franco-American fight for freedom. And soon I will join you in Paris, sir, to observe the 200th anniversary of the French struggle for liberty and equality. And this is just one example of the special bond between two continents. But consider this city. From the Old North Church to Paul Revere's home nestled in the warm heart of the Italian North End, to your famous song-filled Irish pubs, the Old and New Worlds are inseparable in this city. But as we look back to Old World tradition, we must look ahead to a new Europe. Historic changes will shape your careers and your very lives.

The changes that are occurring in Western Europe are less dramatic than those taking place in the East, but they are no less fundamental. The postwar order that began in 1945 is transforming into something very different. And yet certain essentials remain, because our alliance with Western Europe is utterly unlike the cynical power alliances of the past. It is based on far more than the perception of a common enemy; it is a tie of culture and kinship and shared values. And as we look toward the 21st century, Americans and Europeans alike should remember the words of Raymond Aron, who called the alliance a "moral and spiritual community." Our ideals are those of the American Bill of Rights and the French Declaration of the Rights of Man. And it is precisely because the ideals of this community are universal that the world is in ferment today.

Now a new century holds the promise of a united Europe. And as you know, the nations of Western Europe are already moving toward greater economic integration, with the ambitious goal of a single European market in 1992. The United States has often declared it seeks a healing of old enmities, an integration of Europe. And at the same time, there has been an historical ambivalence on the part of some Americans toward a more united Europe. To this ambivalence has been added apprehension at the prospect of 1992. But whatever others may think, this administration is of one mind. We believe a strong, united Europe means a strong America.

Western Europe has a gross domestic product that is roughly equal to our own and a population that exceeds ours. European science leads the world in many fields, and European workers are highly educated and highly skilled. We are ready to develop with the European Community and its member states new mechanisms of consultation and cooperation on political and global issues, from strengthening the forces of democracy in the Third World to managing regional tensions to putting an end to the division of Europe. A resurgent Western Europe is an economic magnet, drawing Eastern Europe closer toward the commonwealth of free nations. A more mature partnership with Western Europe will pose new challenges. There are certain to be clashes and controversies over economic issues. America will, of course, defend its interests. But it is important to distinguish adversaries from allies, and allies from adversaries. What a tragedy, what an absurdity it would be if future historians attribute the demise of the Western alliance to disputes over beef hormones and wars over pasta. We must all work hard to ensure that the Europe of 1992 will adopt the lower barriers of the modern international economy, not the high walls and the moats of medieval commerce.

But our hopes for the future rest ultimately on keeping the peace in Europe. Forty-two years ago, just across the Charles River, Secretary of State George Marshall gave a commencement address that outlined a plan to help Europe recover. Western Europe responded heroically and later joined with us in a partnership for the common defense: a shield we call NATO. And this alliance has always been driven by a spirited debate over the best way to achieve peaceful change. But the deeper truth is that the alliance has achieved an historic peace because it is united by a fundamental purpose. Behind the NATO shield, Europe has now enjoyed 40 free years of conflict—40 years free of conflict—the longest period of peace the Continent has ever known. Behind this shield, the nations of Western Europe have risen from privation to prosperity, all because of the strength and resolve of free peoples.

With a Western Europe that is now coming together, we recognize that new forms of cooperation must be developed. We applaud the defense cooperation developing in the revitalized Western European Union, whose members worked with us to keep open the sealanes of the Persian Gulf. And we applaud the growing military cooperation between West Germany and France. And we welcome British and French programs to modernize their deterrent capability and their moves toward cooperation in this area. It is perfectly right and proper that Europeans increasingly see their defense cooperation as an investment in a secure future. But we do have a major concern of a different order: There's a growing complacency throughout the West.

And, of course, your generation can hardly be expected to share the grip of past anxieties. With such a long peace, it is hard to imagine how it could be otherwise. But our expectations in this rapidly changing world cannot race so far ahead that we forget what is at stake. There's a great irony here. While an ideological earthquake is shaking asunder the very Communist foundation, the West is being tested by complacency. We must never forget that twice in this century American blood has been shed over conflicts that began in Europe. And we share the fervent desire of Europeans to relegate war forever to the province of distant memory. But that is why the Atlantic alliance is so central to our foreign policy. And that's why America remains committed to the alliance and the strategy which has preserved freedom in Europe. We must never forget that to keep the peace in Europe is to keep the peace for America.

NATO's policy of flexible response keeps the United States linked to Europe and lets any would-be aggressors know that they will be met with any level of force needed to repel their attack and frustrate their designs. And our short-range deterrent forces based in Europe, and kept up to date, demonstrate that America's vital interests are bound inextricably to Western Europe and that an attacker can never gamble on a test of strength with just our conventional forces. Though hope is now running high for a more peaceful continent, the history of this century teaches Americans and Europeans to remain prepared.

As we search for a peace that is enduring, I'm grateful for the steps that Mr. Gorbachev is taking. If the Soviets advance solid and constructive plans for peace, then we should give credit where credit is due. And we're seeing sweeping changes in the Soviet Union that show promise of enduring, of becoming ingrained. At the same time, in an era of extraordinary change, we have an obligation to temper optimism—and I am optimistic—with prudence. For example, the Soviet Foreign Minister informed the world last week that his nation's commitment to destroy SS–23 missiles under the recently enacted INF treaty may be reversible. And the Soviets must surely know the results of failure to comply with this solemn agreement. Perhaps their purpose was to divide the West on other issues that you're reading about in the papers today. But regardless, it is clear that Soviet "new thinking" has not yet totally overcome the old.

I believe in a deliberate step-by-step approach to East-West relations because recurring signs show that while change in the Soviet Union is dramatic, it's not yet complete. The Warsaw Pact retains a nearly 12-to-1 advantage over the Atlantic alliance in short-range missiles and rocket launchers capable of delivering nuclear weapons and more than a 2-to-1 advantage in battle tanks. And for that reason, we will also maintain, in cooperation with our allies, ground and air forces in Europe as long as they are wanted and needed to preserve the peace in Europe. At the same time, my administration will place a high and continuing priority on negotiating a less militarized Europe, one with a secure conventional force balance at lower levels of forces. Our aspiration is a real peace, a peace of shared optimism, not a peace of armed camps.

Nineteen-ninety-two is the 500th anniversary of the discovery of the New World, so we have five centuries to celebrate, nothing less than our very civilization—the American Bill of Rights and the French Rights of Man, the ancient and unwritten constitution of Great Britain, and the democratic visions of Konrad Adenauer and Alcide de Gasperi. And in all our celebrations, we observe one fact: This truly is a moral and spiritual community. It is our inheritance, and so, let us protect it. Let us promote it. Let us treasure it for our children, for Americans and Europeans yet unborn. We stand with France as part of a solid alliance. And once again, let me say how proud I am to have received this degree from this noble institution, and to have shared this platform with the President of the French Republic, François Mitterrand.

Thank you very, very much. *Vive la France* and long live the United States of America. Thank you very much.

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